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THE CONDOR

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Issued March 15, 1930

CONTENTS

PAGE

Happenings in a Robin Household ..... *Joseph Mailliard* 77

A Census of the Pleistocene Birds of Rancho La Brea from the Collections of the Los Angeles Museum (with three ills.) ..... *Hildegarde Howard* 81

Philippine Bird Traps (with 13 ills.) ..... *Richard C. McGregor* and *Leon L. Gardner* 89

The Summer Resident Birds of the Boreal and Transition Life-zones of Mount Pinos, California ..... *Alden H. Miller* and *Seth B. Benson* 101

Problems of Bird Conservation in California ..... *Jean M. Linsdale* 105

Further Bird Remains from the Upper San Pedro Pleistocene (with one ill.) ..... *Loye Miller* 116

FROM FIELD AND STUDY

Watermelon as Warbler Food ..... *J. Eugene Law* 119
Prodigious Drillings of a Williamson Sapsucker (with one ill.) ..... *Charles W. Michael* 119
Winter Nesting of the California Linnet ..... *Philbrick Smith* 121
California Spotted Owl in San Diego County, California ..... *Clinton G. Abbott* 121
Vermilion Flycatcher on the Pacific Slope of Southern California ..... *J. Stuart Rowley* 121
Notes on the Golden Eagle in Southern California ..... *Wilson C. Hanna* 121
Notes on the Dowell Bird Collection ..... *Stanley G. Jewett* 124
Horned Owl Attacks Chickens ..... *Sidney B. Peyton* 124
An Unusual Case of Mimicry by a Catbird ..... *Winton Weydemeyer* 124
Drilling Habits of the Flicker ..... *Laurence B. Potter* 125
Breeding Record of Pacific Godwit ..... *Wilson C. Hanna* 126
Two More Victims of the Cowbird ..... *Robert S. Woods* 126
Some Night Observations on the Western Horned Owl ..... *Leon Kelso* 126
Migratory Flight of Swainson Hawks ..... *John McB. Robertson* 127
Notes from the Vicinity of San Francisco Mountain, Arizona ..... *Laurence M. Huey* 128
Say Phoebe Nesting in Western Montana ..... *Caroline Wells* 128
A Second Nesting Record of the Pacific Harlequin Duck in Oregon (with one ill.) ..... *Stanley G. Jewett* 128
Wasp Eaten by a Mockingbird ..... *Robert S. Woods* 129
Wire-perching Woodpeckers ..... *Clinton G. Abbott* 129
Observations on the Dwarf Cowbird ..... *J. Stuart Rowley* 130

EDITORIAL NOTES AND NEWS 132

PUBLICATIONS REVIEWED: McAtee on Naturalizing Game Birds ..... *J. Grinnell* 133
Bryant's Outdoor Heritage ..... *Jean M. Linsdale* 134
Laing and Taverner on Birds of the Mount Logan District, Alaska ..... *J. Grinnell* 134

MINUTES OF COOPER CLUB MEETINGS 135

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HAPPENINGS IN A ROBIN HOUSEHOLD

By JOSEPH MAILLIARD

On coming to my room at the California Academy of Sciences, in Golden Gate Park, San Francisco, on the morning of May 9, 1929, my attention was attracted by the sight of some dry grass, 18 feet from the ground, in the top of a tree poke berry (*Phytolacca dioica*) that grows outside of the window in front of my desk. On this tree the year's growth of foliage was yet young. With first thought of English Sparrow coming to mind the return of the owner of this building material was awaited with interest, for the reason that a nest in such a place would be in plain sight, on a level with one's head (a little lower would have been better), and only ten feet away.

Construction work seemed to be a bit slow in getting under way and it was rather a difficult matter to keep a watchful eye on the tree top while I was trying to attend to desk work. After quite an interval a fresh load of material arrived, but the builder was *not* an English Sparrow—it was a Western Robin (*Turdus migratorius propinquus*). After this, building went on apace. Unfortunately, week-end absences interfered with continuous observation of the nest, and in some of these absences minor things happened that it was rather annoying to miss; but this could not be helped.

About the middle of the morning of May 14, the female robin brought some fine dry grass to the tree and for a while perched pensively on a branch near the nest, all the time holding the dry grass in her bill; but she finally flew away, apparently having concluded that the nest needed no further touches. The process of construction had been interesting to watch, especially the turning of the bird in the nest while moulding the structure into proper shape to suit necessities. The male robin did not do much in the way of assistance, as far as observations went, but confined his labors mostly to criticisms which did not seem to be particularly constructive, judging by the way in which his better half received them.

Upon my arrival at half-past eight on the morning of May 15, the female was seen to be on the nest, where she remained until early afternoon, when she flew away and did not return before I left my desk that evening. By going on the roof of the Academy building and looking over the parapet, one egg could be seen in the nest about 15 feet below.

Next morning the bird again was on the nest at 8:30, but she left it at 10:15 and did not appear again during my stay that day. On May 17 the bird was not seen at all, but examination showed that the nest contained three eggs. A fourth egg was probably laid on Saturday, May 18, during my week-end absence. On my return three days later the female was comfortably established in her incubational

capacity, and she did not leave the nest except once in the afternoon, when she gave a loud squeak and left it very hurriedly, returning in about a quarter of an hour.

While building the nest the female was too much occupied to pay serious attention to the fact that a man was sitting in plain sight only a few feet away from her; but upon my first appearance after incubation began she showed some signs of uneasiness. By my keeping as quiet as conveniently possible, however, and moving only slowly when necessary to move at all, her fears were soon allayed; and after that, unless I stood up suddenly or made some movement of hand or paper toward the window when she happened to be facing it, no uneasiness on her part was manifest.

With the exception of the robin leaving her nest occasionally, always with a screech, and returning in 15 or 20 minutes, there were no happenings to record until May 29, when the first young one appeared in early morning. At 3:43 p. m. the mother left the nest, presumably to obtain food, and examination from the roof showed three eggs to be still intact. On May 31 there were three young in the nest and one unhatched egg. The mother bird was absent on my arrival at the usual hour that morning and remained away until 10:30, when it commenced to rain a little, whereupon she promptly returned and remained on the nest brooding the young most of the afternoon, even long after the rain had ceased falling. After a three day absence from my desk observations were resumed on June 4, when nothing of consequence concerning the robin household was noticed other than the regular feeding of the young by the female parent.

For a long time after the nest was finished the male robin appeared only on two occasions, when he perched for a few moments on the parapet of the east wing of the Academy building, 70 feet away, and uttered a few notes without going near the nest. After the second occasion he staid away so long that it looked as if he had either left his mate or left the world; but on the morning of June 5 he greatly surprised me by suddenly appearing. And from that moment he assisted, more or less assiduously, in feeding the offspring.

On the morning of June 5, which was showery, the female was chiefly brooding the young, but after eleven o'clock she began foraging. Upon returning with supplies from one of these forays she would approach the nest, alight on its rim and gaze into it, at the same time moving or gently snapping her bill. If no beseeching beak were lifted she would settle down on the nest and brood for a while. This action of hers was so much in contrast to her previous activity in supplying food that it made me suspicious of there being something wrong, so that the next time she left the nest it was examined from the roof, from which point *only one young bird* could now be discerned.

The twigs and leaves of the poke berry tree had been growing around the nest in such manner as partly to hide it even from the roof; so I tied a knife to a stick and managed to cut away a little of the foliage, which left the nest in plain sight from my desk. Upon her next return the mother bird eyed me rather askance, but finally quieted down again. After a while a gaping bill forced itself up beside her and she went off for more food. In a few moments the male arrived and perched on the edge of the nest as a beak was uplifted, but he caught sight of me and hastily fled. However, he returned in a couple of minutes and fed the young one.

This morning the female occasionally stood on the edge of the nest and pecked at something inside, after each peck going through the motion of swallowing. These actions suggested the presence of some insect pest either in the nest or on the young bird and that the parent was picking up larvae and swallowing them. The dis-

appearance from this nest of the other nestlings, which were present and alive on May 31, had at first been ascribed to the depredations of either a squirrel or a rat, unlikely as it seemed that this nest would have been discovered by these rodents, which did not frequent this particular locality, or that one of the nestlings would have been left unharmed when the others were taken. The actions of the mother bird on this particular morning seemed to indicate the possibility that the nest had been visited by a parasitic fly of the genus *Protocalliphora*, if so, most probably of the species *azurea* (see Plath, Condor, XXI, 1919, p. 37), and that the missing nestlings had died from weakness caused by the draining of their blood by the larvae of this fly, after which their remains had been removed from the nest by the parents. It may seem rather a short time, between May 31 and June 5, for all this to happen, but some members of this parasitic genus of fly are viviparous and others lay eggs—even in the nest itself—that hatch in a day or two, so the larvae would promptly be ready to begin their deadly work on the young brood. Under the first impression, that the loss of the nestlings was caused by predatory animals, the ground under the tree was, unfortunately, not searched for remains.

On June 6 the nestling was uneasy, as if annoyed by something, and several times the mother bird perched on the edge of the nest, as before described, and pecked downward, apparently not deep enough to touch the bottom of the nest, but far enough down to pick something off the young bird, and again always seemed to swallow whatever it had picked up. Most unfortunately the nest was inaccesible to me, even though it was so near the window, as the tree was too slender to be climbed and yet too stout to be bent over so that a proper examination could be made.

With but one juvenile stomach to fill the parents had an easy time keeping it supplied with food. Often a parent would arrive with some choice morsel only to find the young one asleep, whereupon the parent would perch on the edge of or near the nest and patiently wait until the nestling awoke, sometimes gently chirping to it to see if it really were asleep, as being so well fed made the sole young one far less ravenous than would have been a member of a large brood. My notes of June 7 show that the female perched on the rim of the nest in the middle of that morning for about 15 minutes, during which the nestling was quiet except that once it raised its head, whereupon the female thrust her tightly closed bill three times in quick succession down the young one's wide open throat, to all appearances merely going through the motion of feeding it. During this performance there was no outward indication of anything like regurgitation on the part of the parent bird, nor of the delivery of any food whatever; yet after this action the nestling settled down blissfully into the nest as if perfectly satisfied, whereupon the parent did a little more of the mysterious pecking into the nest and flew away.

Upon returning on June 11 from a three day absence I noticed spotted feathers just beginning to show on the young one's breast, with other feather tracts correspondingly advanced. This day was of pleasant temperature, yet the sun seemed to be beating rather too strongly upon the nest, on account of the removal of some of the foliage for a better view, and the female, panting and with mouth open, was sheltering the young bird from the heat. At times she would repeat the performance of pecking into the nest or at something on the nestling, going through this motion several times in quick succession and always swallowing after each peck although nothing was ever visible in her bill by the time that her head appeared again above the edge of the nest.

On June 12 the nestling appeared to be hungry and really eager for food, reaching up and fluttering its wings when a parent came near. In the afternoon it

succeeded in getting its wings over the rim of the nest and on one occasion it almost fell out. This afternoon it was very restless and occasionally would utter a squawk, at the same time acting as if it were much troubled by insects. Toward the end of the afternoon it commenced for the first time to use its bill in attempts to alleviate the annoyance.

Up to this time the nestling had paid no attention whatever to sights or sounds not immediately associated with its parents or with its intimate surroundings; but, on June 13, the noise made by the raising of my window, the nearest part of which was six feet from the nest, evidently created a feeling of fear in the brain of the fast developing juvenile, causing it to huddle down in the nest and to stay in that position for some time. Something was annoying the nestling to such an extent that day that it was impossible to arrive at any other conclusion than that of the annoyance being caused by an insect pest, and finally I tied a can to a long stick and sprinkled insect powder liberally over nest and nestling.

The morning of June 14 found the young robin much more quiet than it had been on the preceding day, as far as insect troubles were concerned, but it was squeaking a good deal, getting up on the rim of the nest from time to time and stretching its wings which were now well feathered and seemed to be sufficiently developed for flight. About half-past eleven that morning I happened to look up from my work and saw the young bird standing on the edge of the nest, with no parent in the vicinity. While I was looking, it deliberately pitched forward off the nest and fluttered to a lower tree near by. The male parent arrived a few minutes later with a large black or dark blue berry of some sort in its bill and stood on the rim of the nest, nonplussed for the moment, gave me a sort of reproachful look and flew away. Twice after that, within a few days, a young robin, presumably my young acquaintance as there was no other brood of its age in the vicinity, came to the nest, staid a few moments and flew away, on the last occasion ending its individual history as far as man may know.

Some time after this the nest was pushed out of the tree in order to examine it closely in case there might be something worth recording concerning it. The inner lining, of fine dry grass, had become brittle and had been worn away from the mud wall of the nest and among the resulting litter in the bottom were forty or fifty small objects that looked a good deal like cocoons. These were from five to eight millimeters long by four to five millimeters in diameter. Some of these "cocoons" had been pressed against the mud wall, near the bottom of the nest, and were still sticking there when the nest was examined. Samples of the "cocoons" were submitted to several entomologists, who failed to identify them, and were then sent to Washington, D. C., where Dr. J. M. Aldrich, of the National Museum, pronounced them to be seeds of plants and Mr. W. L. McAtee, Food Habits Research expert of the Biological Survey, identified them as seeds of the English ivy (*Hedera helix*), with the accompanying remark that these seeds ". . . are not known to be used as food by robins and if they had been brought for food it is not likely that they would have been allowed to accumulate in the bottom of the nest."

The ivy seeds did not appear to have passed through the digestive tract of a bird and, furthermore, excrement was always promptly removed from the nest, principally by the male bird. In the climate of San Francisco, as is the case with many other perennial plants, ivy is rather casual about the time of year in which it bears fruit, but the nearest growth of this plant to the nest site is away over on the other side of the Academy building, and no fruit from it could possibly have fallen into the nest, so the presence therein of the seeds is a mystery unsolved.

California Academy of Sciences, San Francisco, November 30, 1929.

A CENSUS OF THE PLEISTOCENE BIRDS OF RANCHO LA BREA FROM THE COLLECTIONS OF THE LOS ANGELES MUSEUM

WITH THREE ILLUSTRATIONS

By HILDEGARDE HOWARD

In a recent paper, Dr. Chester Stock (Jour. Mammalogy, 10, 1929, pp. 281-289) has presented a census of the Pleistocene mammals of Rancho La Brea. At the suggestion of Dr. Stock the present paper has been prepared, presenting a similar census of the Pleistocene birds of the region. In this paper the writer has attempted as nearly as possible to follow the plan adopted by Dr. Stock in the matter of graphs, so that the two studies may be correlative.

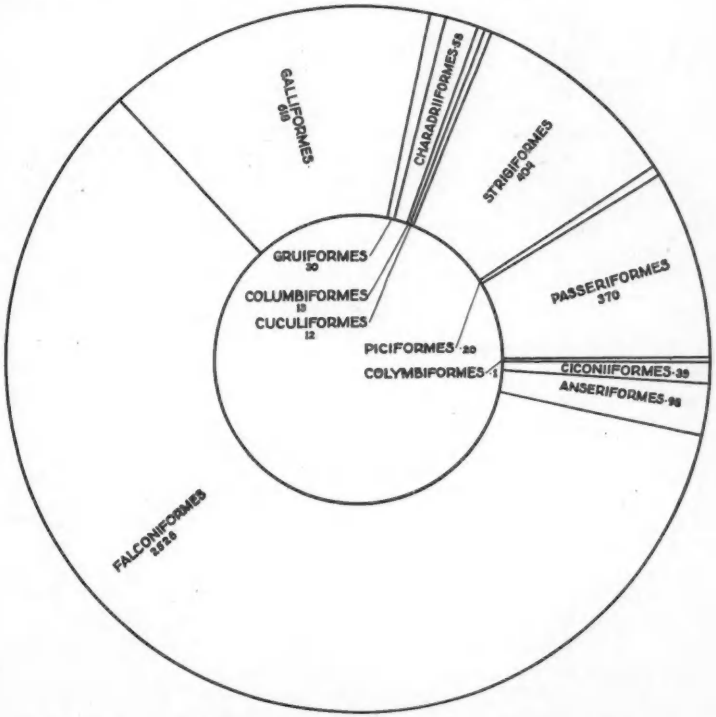


Fig. 29. DIAGRAM SHOWING THE RELATIVE ABUNDANCE OF INDIVIDUALS IN EACH ORDER OF BIRDS RECORDED FROM THE RANCHO LA BREA PLEISTOCENE.
Drawing by H. A. Wylde.

In taking a census of the birds, both young and adult individuals were considered. For each species, the left or the right of the element occurring in greatest abundance was used to make the count. In most instances the element chosen was the tarsometatarsus, though the humerus and the tibiotarsus were also considered. In all cases the specimens were counted individually and no approximate totals are given. It is probable that in many instances the totals present a minimum estimate

of the number of individuals actually represented in the collection. With regard to the small birds, it is certain that the numbers actually entrapped in the tar pits exceeded the numbers which are recorded here. The smaller bones would easily be overlooked in these excavations where so many large specimens claimed attention.

A full list of the species included in the Anseriformes, Charadriiformes and Passeriformes is omitted, since these groups, as represented in the Los Angeles Museum collection, have not been studied in sufficient detail to make possible a count of the number of individuals within each species. For the Anseriformes and Charadriiformes, only the total number of individuals for each order is given. For

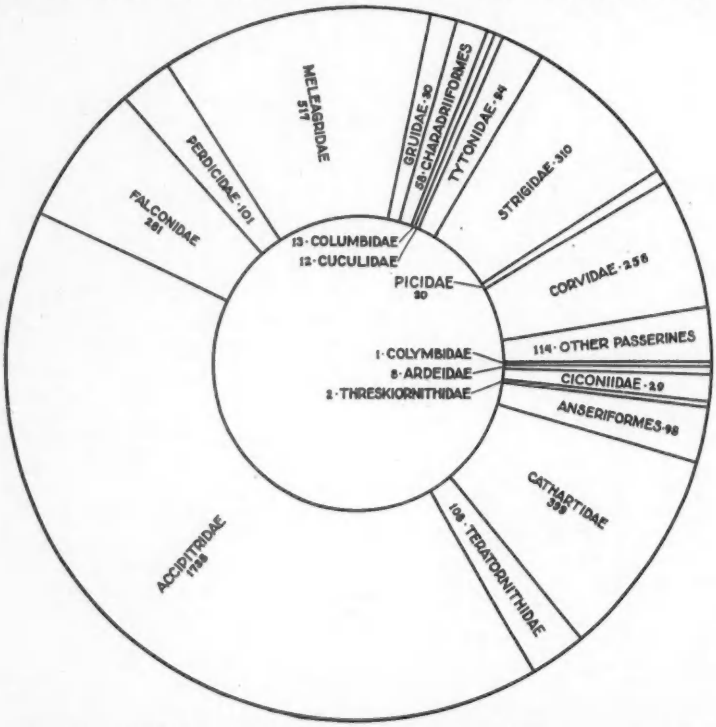


Fig. 30. DIAGRAM SHOWING THE RELATIVE ABUNDANCE OF INDIVIDUALS IN EACH FAMILY OF BIRDS RECORDED FROM THE RANCHO LA BREA PLEISTOCENE.

Drawing by H. A. Wylde.

the Passeriformes, the species under the family Corvidae are listed, all other families being grouped together. For a more detailed account of the passerines, the reader is referred to a paper by Alden H. Miller (Univ. Calif. Publ. Bull. Dept. Geol. Sci., 19, 1929, pp. 1-22) on the Rancho La Brea passerines of the University of California collections.

All species listed for the remaining orders, with the sole exception of *Mycteria americana*, are determined on the basis of specimens in the Los Angeles Museum collections. This species is represented by a single specimen of the symphysial region

of a lower jaw, and is contained in the collections made by the Los Angeles High School. Since Dr. Loye Miller (Carnegie Inst. Wash., Publ. 349, 1925, pp. 74-75) is convinced of the close relationship of the specimen to *Mycteria americana*, though the specimen has apparently been lost, the species is included here in order to make the list complete as described to date.

The total number of individuals in the Pleistocene avian population of Rancho La Brea, as represented in the Los Angeles Museum collections, is 4189. Of this number approximately 310 are young individuals, nearly one-half of which belong to the extinct species of turkey, *Parapavo*.

The accompanying figures are designed to show the relative sizes of the orders, families, and genera and species which occur.

Figure 29 is a diagrammatical presentation of the relative sizes of the twelve orders recorded at Rancho La Brea. The Falconiformes are most abundant, with 2526 individuals. Next in number to the Falconiformes are the Galliformes with a total of 618. The latter are followed by the Strigiformes with 404 and by the Passeriformes with 370. Following these in order of greatest abundance are the Anseriformes (98), Charadriiformes (58), Ciconiiformes (39), Gruiformes (30), Piciformes (20), Columbiformes (13), Cuculiformes (12), and lastly the Colymbiformes with but a single specimen.

In figure 30, the relative sizes of the families of birds from the asphalt are diagrammatically illustrated. The hawks and eagles (Accipitridae) are most abundant, not only of the raptorial birds, but of the entire assemblage. The number of individuals totals 1738, or 68.8% of the order Falconiformes. Next in abundance are the New World Vultures, including in this category the Teratornithidae as well as the Cathartidae, since the sole representative of the former family, *Teratornis*, shows affinity with the true cathartids. The remaining falconiform family, as well as the two families of owls, are subordinated to the Meleagridae, whose 517 individuals make up approximately 12% of the total avian population. A second family of gallinaceous birds occurring here (Perdicidae) is of smaller size, approaching in number the Tytonidae, or Barn Owls. Of the passerines, the Corvidae are fairly abundant, having 256 individuals, or 69% of the total passerine population. Each of the remaining families is represented by not more than thirty individuals, the cranes totalling 30, followed by the storks with 29, the woodpeckers 20, doves and pigeons 13, cuckoos 12, herons 8, ibises 2, and grebes 1. Since the Anseriformes and Charadriiformes have not been studied in detail, no attempt has been made in the diagram to divide these orders into families.

Figure 31 indicates the various genera and species recorded from Rancho La Brea Pleistocene; an asterisk marks those species which are now extinct. The identity of *Florida caerulea* is questioned because of possible confusion with *Hydranassa tricolor*. The two genera of storks are listed together since the writer experienced some difficulty in distinguishing between them. Those specimens identified as *Buteo borealis* may possibly include *Buteo regalis* as well; for this reason the determination which has been made is tentative. "*Buteo* sp." refers to a group of individuals somewhat resembling *B. lineatus* in general proportions, but which have been set apart from that species (Miller, L., Carnegie Inst. Wash., Publ. 349, 1925, p. 95). The identification of *Asyndesmus lewisi* is questioned because of a possibility of confusion with *Balanosphyra*. The jay, *Aphelocoma*, has not been identified as to species.

There are two genera, namely *Lophortyx* and *Speotyto*, whose apparent rarity

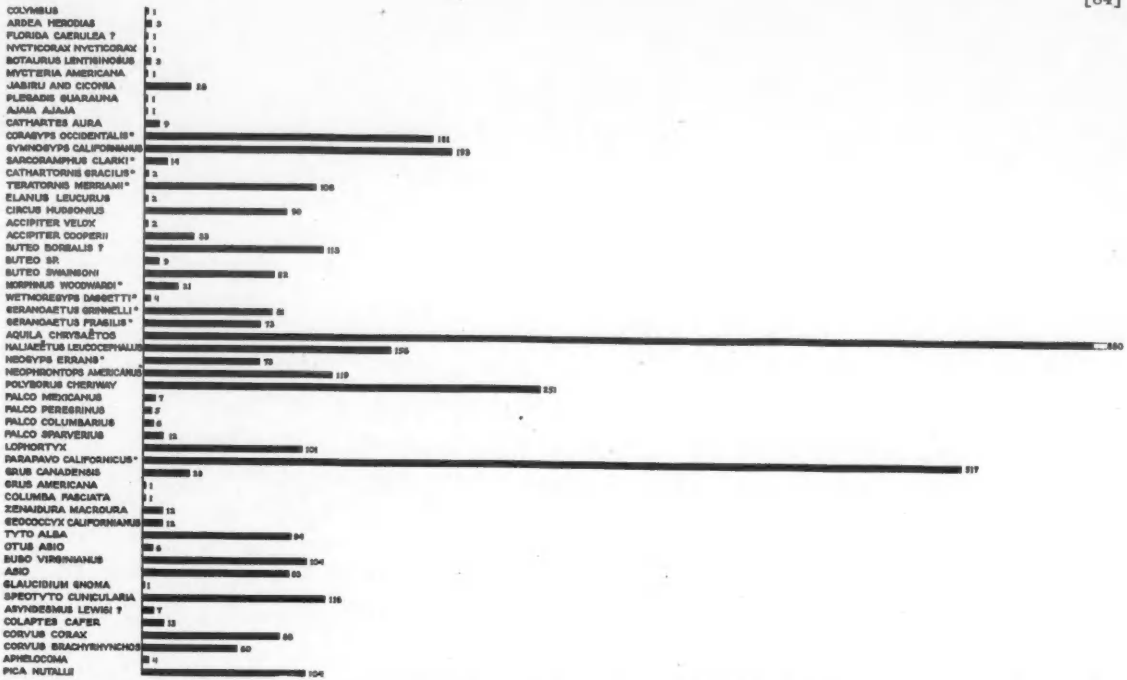


Fig. 31. GRAPH INDICATING THE NUMBER OF INDIVIDUALS IN EACH GENUS AND SPECIES RECORDED FROM THE RANCHO LA BREA PLEISTOCENE. (*Extinct.)

Drawing by H. A. Wylde.

in the Rancho La Brea assemblage has hitherto caused comment (Miller, L., Carnegie Inst. Wash., Publ. 349, 1925, pp. 79, 104). These are now found to approach their expected abundance.

The number of individuals of the genus *Lophortyx* still does not equal that of its larger relative, *Parapavo*; but this does not necessarily indicate that the quail was not as abundant, considering the small size of a quail bone as compared with that of a turkey. For, as we have previously remarked, it is not improbable that many of the smaller bones escaped notice in excavation. It is worthy of comment, in this regard, that the quail is more abundant than any species of small raptorial bird with the exception of *Speotyto*, and is third in abundance of all the smaller birds, *Pica nutallii* exceeding it by three individuals.

In a deposit such as that at Rancho La Brea, it is apparent that certain abnormalities in occurrence may exist, due to differences in species in degree of wariness or of susceptibility to the attractions of the traps.

A consideration of the bird assemblage immediately reveals an abnormality in the relative numbers of raptorial and non-raptorial species. This superabundance of predators, which is also notable in the mammalian assemblage, has been remarked upon frequently by various writers as resulting from the peculiar method of accumulation of specimens in the tar pits, these pits constituting huge traps baited at intervals with animals which had become mired in the tar. Of the twelve orders into which the birds of the Rancho La Brea avifauna are grouped, the two orders of raptors, the Falconiformes and the Strigiformes, contain 69.9% of the total number of individuals, or 2930. Of this number, nearly seven-eighths are falconiforms, and of the Falconiformes approximately 85% are of the larger types, the hawks and small falcons being decidedly in the minority. Miller (Carnegie Inst. Wash., Publ. 349, 1925, p. 103) has offered two suggestions in this regard: (1) That the "cooling of the asphalt at night may have rendered the trap less dangerous to owls than to birds hunting by day", and (2) that "more copious outpour [of asphalt] during the Pleistocene may have resulted in rapid entombment of small forms, leaving only the larger victims exposed to view. Results of this more rapid entombment would be that the small hawks and the owls would find bait less constantly before them." Another point of note with regard to the predatory birds is that only one-half of the individuals recorded are of species which are strictly carrion feeders. This fact is not altogether surprising, however, when we consider that, until the head was submerged, the mired animals probably remained alive and continued to attract attention by their struggles.

In spite of the spectacular occurrence of the raptors, there are certain other smaller groups which present a more accurate and more natural picture of the environment of Rancho La Brea.

The scarcity of birds of water associations has been commented upon by previous writers. In the present census these birds are found to make up only 5.3% of the total assemblage. Considering the abundance of water birds in deposits of a similar nature at McKittrick, their rare occurrence at Rancho La Brea can hardly be attributed to wariness, but would seem to point, rather, to their scarcity in the immediate neighborhood. This scarcity of water birds has been noted by Miller (Carnegie Inst. Wash., Publ. 349, 1925, p. 71) as indicative of the ephemeral nature of such bodies of water as may have existed in the vicinity of the tar pits during the Pleistocene. Possibly, during the rainy months, water accumulated to a depth of a few inches over the asphalt much as it does in the pool exposed at Rancho La Brea today. Granville Ashcroft has reported to the writer a similar instance near

Tampico, where an artificial asphalt lake becomes covered with water to a depth of 1 to 3 inches during rainy weather, and where water birds attracted to the lake at this time alight upon its water-covered surface and are trapped. In dry weather the surface becomes slightly hardened and covered by dust and leaves so that it appears as solid as the surrounding country.

There is also evidence that some of the Pleistocene water birds were not merely transient visitors to Rancho La Brea, but that they were actually breeding in the region. This evidence is based upon the presence of incompletely ossified bones of very young individuals. The groups so represented and the number of young noted are: White-faced Glossy Ibis 1, ducks 14, cranes 4, charadriiforms 2. Such evidence would indicate the presence of water not far from, or even at the edges of, some of the pits. The presence of one young of the Great Blue Heron, and nine of the storks, though not in itself indicative of water nearby, is certainly not contradictory of this supposition. The evidence presented by the occurrence of young birds is in keeping with Miller's statement as to the ephemeral nature of the water bodies of this region. Had water always been plentiful there, the number of young represented in the pits would presumably have been greater.

Other breeding residents of the vicinity of the tar traps, as indicated by the presence of young, were *Parapavo* (152), *Lophortyx* (10), *Zenaidura* (4), and *Geococcyx* (7), as well as ten species of raptors.

In view of the abundance of specimens of the genus *Parapavo*, not only of adult, but of young birds as well, there can be no doubt as to the suitability of the region for this turkey-like bird. The living wild turkeys of North and South America, with which *Parapavo* is structurally similar, inhabit wooded areas. The food of the Merriam Turkey in New Mexico in winter is said to consist of pinyon nuts, acorns, and juniper berries (Bailey, F. M., The Birds of New Mexico, 1928, p. 233). Possibly *Parapavo* subsisted on a somewhat similar diet, a supposition which is in line with the facts regarding the flora of the region as brought out by Frost (Univ. Calif. Publ. Botany, 14, 1927, pp. 73-96). According to Frost the most abundant trees of the Rancho La Brea region in the Pleistocene were the La Brea Juniper and the Coast Live Oak, with the Blue Elderberry, Knob Cone Pine and Monterey Cypress also represented. The indications are that the juniper and live oak grew close to the pits, or at least to certain of the pits in which branches, and even a trunk of the juniper tree, are found.

Such an environment as is represented by the flora recorded by Frost was suitable also for the Road-runner, the Mourning Dove, and the Pigeon, though the latter was apparently a rare visitor to the region. Even the doves are of surprisingly rare occurrence in view of their ground habits which, it would be supposed, would have led them to be particularly susceptible to entrapment. There is again the possibility that the small size of their bones caused them to be overlooked during the excavations.

The live oak and juniper may also have offered suitable nesting sites to certain of the raptors whose young are noted in the assemblage. These are: *Polyborus* (25), *Neophrontops* (8), *Tyto* (8), *Geranoaëtus fragilis* (3), *Buteo swainsoni* (3), *Accipiter cooperii* (1), *Falco columbarius* (1), and *Falco sparverius* (1). Twenty-five young of *Coragyps occidentalis* also are present. Since this is an extinct species, its nesting habits cannot be ascertained, but presumably its behavior was similar to that of its modern relative, *C. urubu*, which nests under the branches of bushes, or in hollow logs. Either of these nesting sites was undoubtedly available

in the Rancho La Brea region in the Pleistocene, the low brush affording breeding places for the quail as well.

That the entire area surrounding the tar traps was not wooded is attested by the presence of *Speotyto*, which is associated with more open country. Of the 116 individuals of *Speotyto*, 37 are young.

[For previous references to the Rancho La Brea birds in relation to their environment, see Miller, L., Univ. Calif. Publ. Geol., 7, 1912, pp. 103-105, 108-111, as well as Miller, L., Carnegie Inst. Wash., Publ. 349, 1925, pp. 66-106.]

It will be noted that, unlike the mammals, the extinct species of birds are not in all cases the most abundantly represented of their respective families. In the Accipitridae, the Golden Eagle (*Aquila chrysaëtos*) is more abundant than all of the remaining accipitrids together. In the Cathartidae, *Gymnogyps californianus* is more abundant than *Sarcoramphus clarki* and *Cathartornis gracilis*, or even *Coragyps occidentalis*, which latter does not differ decidedly from *Coragyps urubu*, the Black Vulture now living. The families Meleagridae and Teratornithidae are each represented by a single species now extinct. However, if *Teratornis* be compared with the most closely related living species, *Gymnogyps californianus*, the latter is found to surpass it in number of individuals by about 85. The remaining twelve families have no extinct representatives.

The ratio of the number of individuals belonging to extinct species, to the total number of individuals, cannot be compared with a similar ratio in mammals since the smaller mammals have not been included in Dr. Stock's mammal census. We may, however, compare the predatory birds with the predatory mammals, both of which, by reason of the peculiar conditions of their entrapment, are more completely represented than any other group of birds or mammals. The ratio of extinct to living in the predatory birds, on the basis of numbers of individuals, is 23.8%, in the mammals 93.1%.

A similar discrepancy may be noted in the relative number of extinct predatory species. Though actually the birds number three more extinct species, they also number fifteen more non-extinct species, than do the mammals. Thus, relatively 31.2% of the species of predatory birds are extinct, as against 50% of the mammals.

This discrepancy recalls a fact; often noted, that in birds changes occur more slowly, and species are longer lived, than in mammals, a condition undoubtedly associated with the power of flight. This point should be taken into consideration in attempting to use birds as indicators of the age of a deposit. For short geological intervals, they are of little value, but over longer periods, if available, they may serve as a valuable check upon the evidence presented by the mammalian fauna. In the present instance, the evidence furnished by the abundance of large Falconiformes as compared with the few species now existing, appears to be the greatest contribution which birds offer in determining the age of the Rancho La Brea beds. Two-thirds of the species of large falconiforms of the asphalt are now extinct. The extinction of these species was probably, in part at least, the result of the extinction or decrease in numbers of mammalian forms, or of other species of birds, such as the turkey, *Parapavo*. That the extinction of the larger raptors is continuing today may be observed by the ever decreasing numbers of *Gymnogyps californianus* and *Haliaëtus leucocephalus*, as well as the southerly limitation of *Polyborus* and of the generic types most closely related to the Pleistocene condors and eagles. The occurrence of the more ancient types in the southern hemispheres has often been noted, and its significance is recalled in this instance upon observing the greater abundance of falconiform birds now living in South and Central America as com-

pared with North America. In brief, the extinction of the large Falconiformes appears to have begun with the diminishing in number of the species upon which they preyed, and has not yet reached its culmination. To the writer, this evidence indicates the limitation of the age of the Rancho La Brea deposits to the middle, or to the early part of the late Pleistocene.

Los Angeles Museum, Los Angeles, California, December 30, 1929.

PHILIPPINE BIRD TRAPS

WITH THIRTEEN ILLUSTRATIONS

By RICHARD C. McGREGOR and LEON L. GARDNER

Thousands of birds appear annually in the markets of the Philippine Islands. Snipe, quails, wild ducks, silvereyes, weavers, rails, Java sparrows, parrakeets, doves, fruit pigeons, and many more are found commonly. Some of these are vended in the streets as cage birds; many are sold for food. Most of them are living; practically none has been shot. How are these birds obtained? The people possess almost no firearms, and most of them could ill afford the cost of shells alone. Nevertheless, birds are readily secured and abundantly exposed for sale.

In a land which does not raise enough produce to support itself, where the quest for food is the main occupation of life, where the frog in the roadside puddle is angled, the minnow in the brook seined, and the all-consuming locust itself consumed, it is not surprising (though regrettable) that birds are considered largely in the light of dietary additions.

One day, coming down after six months in the mountains of Benguet, with these thoughts in mind, the junior author of the present article dropped in to see McGregor at the Bureau of Science.

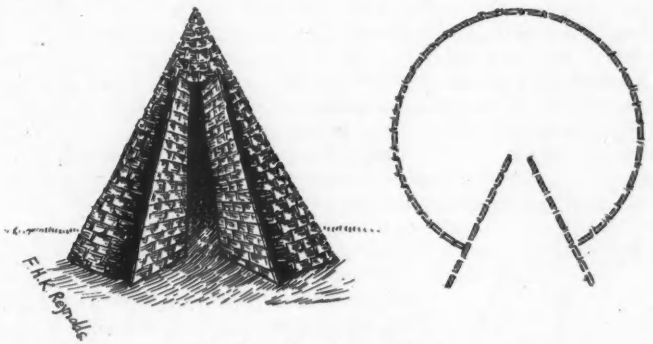


Fig. 32. THE TEEPEE TRAP.

"Weren't you marooned for some months on Calayan Island and running out of rations so that you had to resort to snaring birds? You know, the time General Wood had to rescue you." (This latter was thrown in because it always makes him mad and evens up the score for his offer to said junior of one of his "Favoritas Stupefactos" that he knows will render the latter hors de combat in the shortest of order.)

"No, we weren't running out, the running was all over—we were entirely out of food. We had crossed to Calayan from Aparri in a sail boat and the typhoons kept us there for about five months. We had no food, very little ammunition, and subsisted on the fruit thrushes, *Hypsipetes fugensis*, that were abundant, were feeding on wild red peppers, and were serving as an important article of diet for the residents of the island. We snared them, baiting with branches of artificial red peppers made of sealing wax."

This conversation crystallized a plan, that we had each developed, to record the various ingenious and effectual devices employed by Filipinos for trapping and

snaring birds. Added to this, McGregor at intervals for years has kept a record of the species that have appeared in the markets and which is of value in itself and as an indication of the efficacy of the methods used.

1. The Tepee Trap (fig. 32). This consists of a conical tepee, woven of split bamboo and rattan about 3 feet high and 3 feet across at the base, with a fairly narrow entrance. Two removable bamboo wings, or partitions, are thrust through this doorway and converge toward the center of the trap to form a slit that gives into the interior. In other words, a V-shaped entrance is formed with the apex of the V pointing to the interior of the trap. These wings project slightly beyond the exterior of the tepee, and from these ends low diverging fences are pegged out for about 4 feet to form a still larger V with the entrance to the trap as the apex.

The trap is used in grassland and marshes to catch the birds that skulk in such a habitat. For this purpose it is covered with rushes and grass. A light line is tied to the outer end of one of the little fences and led around to encircle a considerable area of marsh where it lies on top of the reeds and grasses. It is now gently twitched and drawn in, the trapper as he does so gradually approaching the end of the opposite fence (where he hides) until the birds are completely encircled. They run before this advancing disturbance on the grass tops and seek refuge in the dark interior of the trap.

As many as twenty to thirty birds have been caught in this way in one haul of the line. Such birds as *Turnix* and *Excalfactoria* (button quails), *Amaurornis* (water hen), *Gallinula, Hypotænidia philippensis* and *H. striata* (rails), and *Ixobrychus* are the usual takes. This method does not injure the birds and might be of some use in bird-banding operations in the United States. It is the only one we found that could be used for such purposes.

2. Spring Snares. These snares all depend on the principle of a slip noose fastened to a strongly bent bamboo or other elastic branch, which is released by a trigger. This trigger is usually the perch of the trap.

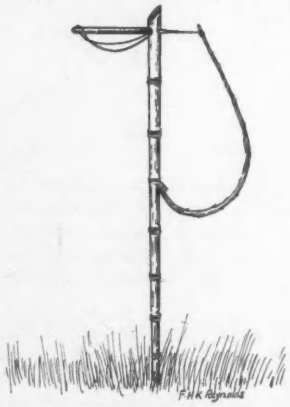


Fig. 33. THE CALAYAN SNARE.

(a) The Calayan Snare (fig. 33). (1) A bamboo pole some 4 feet long is cut and all branches are removed save one slender withe at the lower end. This is bent strongly backward and a line passed from the end of it through a hole drilled in the pole. On the opposite side of the pole a slip noose is made in the string. A light perch is pushed into the hole in the pole just tightly enough to prevent the noose and string from being drawn through by the elastic pull of the bent withe. The noose encircles the perch horizontally. This pole is inserted in the ground, lower end up, and the bait planted on the top of the pole. Birds coming to the bait drop on the perch, knock it loose from the hole, release the spring, and are caught by the legs in the slip noose which is drawn tightly against the pole. Fruit thrushes (*Hypsipetes*) fall ready victims to this trap and in Calayan Island constitute a good portion of the local diet.

(2) A modification of this is used to snare the large fishing hawks and eagles such as *Haliastur* and *Cuncuma*. Here a large stone hanging from the cord serves

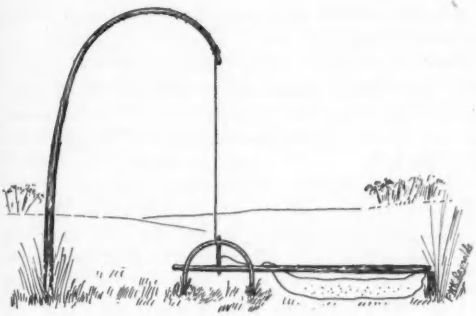


Fig. 34. THE PAÑAPAC.

in place of the withe, as the spring of the trap. The pole is driven into the mud; the perch, lightly pegged into the hole that holds the string and noose, is baited with a fish that lies on the surface of the water.

(b) The Pañapac (fig. 34). This consists of an arched wicket driven into the ground, a crosspiece (the trigger or perch), the usual bent bamboo spring, and a little lock stick, or vertical piece, tied in the string, which ends in a noose. The short upright lock stick is passed through the wicket and is held in place by the trigger which spans the wicket, as reference to the illustration readily shows. The trigger extends beyond the wicket for some distance, and the noose lying on the ground encircles it.

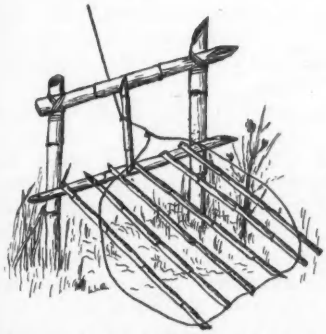


Fig. 35. THE CILO. FOR CONVENIENCE THE SPRING HAS BEEN OMITTED FROM THE ILLUSTRATION.

(c) The Cilo (fig. 35). In this variation there are two uprights bound together at the top by a crosspiece. The short vertical, or lock, stick is held by this above and a short loose crosspiece below which does not extend beyond the sides of the arch. Several sticks form a little ramp, run from the ground to this loose crosspiece, and the noose is spread over this ramp. It has the advantage that a step anywhere inside the noose will set off the mechanism.

These two traps are used extensively for ground-feeding birds, especially doves. Occasionally wild hogs are caught in this type of snare.

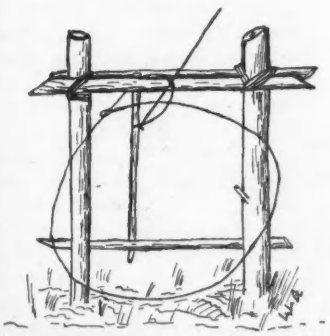


Fig. 36. THE IGOROTE KOKOLANG. (After Jenks.)

(d) The Igorote Kokolang[1] (fig. 36). This utilizes the same principles as the cilo except that there is no ramp, the uprights are bound together by the two crosspieces above, between which the string of the noose passes, and the victim is thus held and strangled against these crosspieces. It is used necessarily in runways, since game must attempt to pass through before the trigger can be sprung. The noose encircles the opening of this arch. It is used to catch wild chickens and wild cats.

[1] A. E. Jenks, The Bontoc Igorot, Ethnological Survey Publications, 1 (1905), p. 84.

(e) Crow Trap. This varies more in detail than in principle from the usual spring snare. Figure 37 illustrates such a trap.

3. Nest Snares (fig. 38). These can be used only where the nest of a bird is found and where it is of the usual cup-shaped design. The principle of the trap is to suspend snares over the nest on four sides and catch the bird as it attempts to regain the nest. Two light pieces of bamboo are placed at right angles to each other and tied at the intersection. These are now strongly bent to form a dome-shaped device and the four free ends tied around the outside to hold the shape.

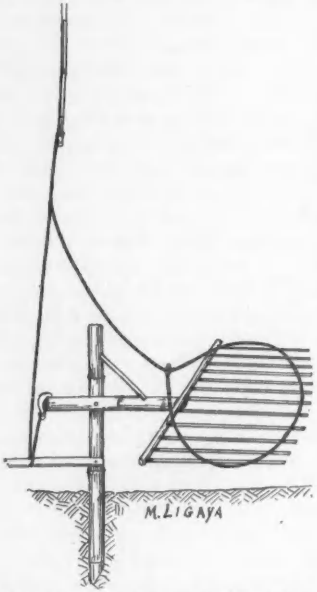


Fig. 37. THE CROW TRAP. (After Culter.)

(a) For use over nests, snares are hung on each of the four sides and secured at the top to the intersection of the bamboos. The trap is placed on top of the nest and the returning bird is caught in one of the nooses. The size and the height depend on the size of the bird to be caught. *Oriolus, Pycnonotus* (bulbuls), *Geocichla* (thrushes), and various species of doves are frequently caught in this kind of trap.

(b) A clever modification is employed to catch ground-feeding birds. Corn is tied to the intersection of the bows of the trap. A shallow pit is dug in the ground, and the device is now placed in the pit with the bows down and the opening directed upward (fig. 39). A noose, which is firmly attached to a peg, is spread over the mouth of the trap; the whole being flush with the surface of the ground. Bait is scattered loosely around. A wild chicken reaching into this shallow depression for the corn puts its head through the noose. On picking up the corn (which is tied) the entire light bamboo trap is lifted, settling the noose over the neck, and any attempt to escape leads to strangulation (fig. 40). The trap is made about 4 inches across and 2 inches deep for chickens and about 2 by 2 for doves. *Chalcophaps, Gallus* and *Gallicolumba* can be caught in this way.

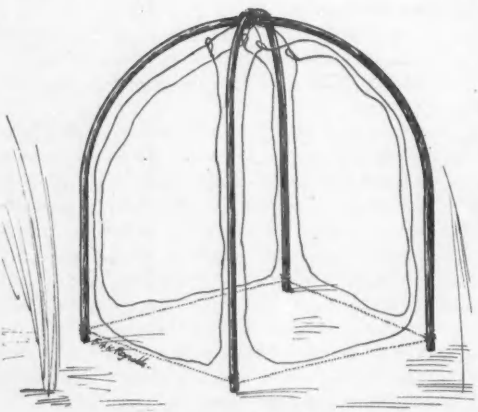


Fig. 38. THE NEST SNARE.

4. Wild Cock Snare. This consists of a braided bejuco (rattan) rope which is pegged out to form three sides of a hollow square, the fourth side

being a pile of rocks or a cliff. It is staked a few inches from the ground and measures 3 to 4 feet on a side. Standing up from the rope are rattan or split bamboo nooses about 6 inches in diameter in a continuous chain around the three sides. A game cock is pegged in the middle where he crows his challenge. Wild cocks are attracted and, while rushing in to fight the lure cock, are entangled in the snares. A boy hiding nearby secures the trapped cock.

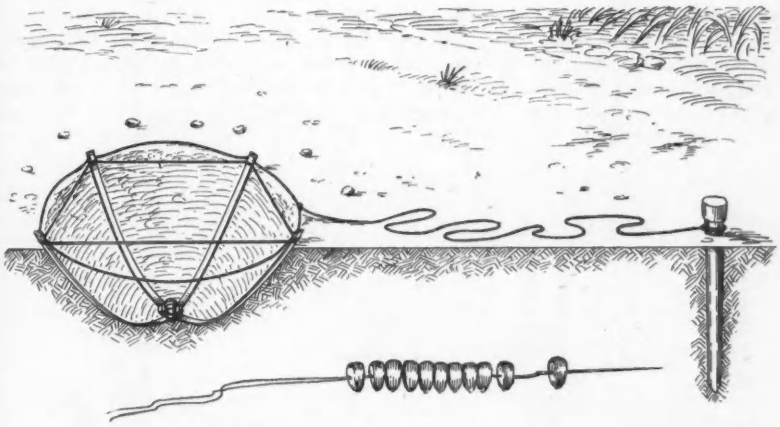


Fig. 39. THE NEST SNARE AS USED IN THE GROUND. NOTE WAY CORN IS STRUNG ON STRING.

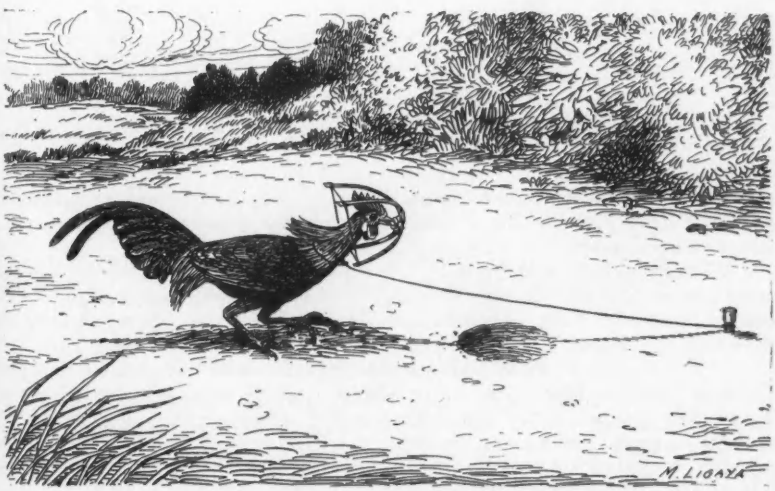
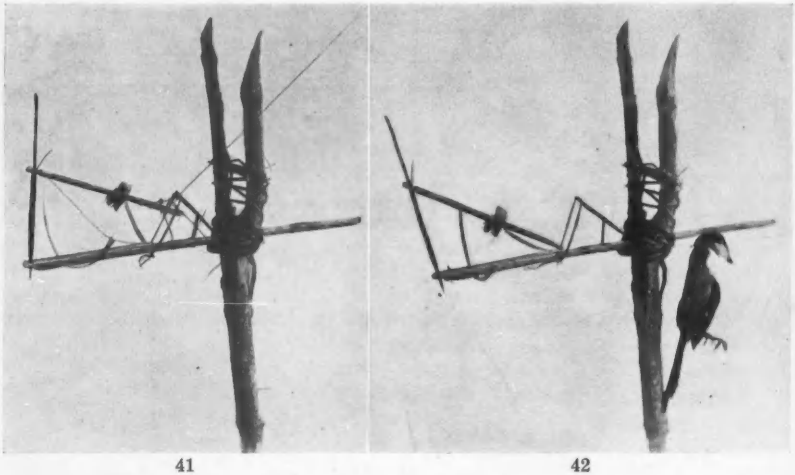


Fig. 40. WILD CHICKEN TRAPPED BY MEANS OF NEST SNARE IN GROUND.

5. The Water Snare. A living water spider is pinned or fastened on a stick which is driven into the mud deep enough to permit the spider's legs to kick on the surface of the water. A slip noose made from the end of a cock's tail feather or of horse hair is tied to a peg which is also driven securely into the mud. This noose frames the spider. Birds dipping and swooping to take this spider pass through the noose and are caught. *Artamus* (swallow shrikes), *Sterna,* and *Hirundo javanica* are trapped with this device. With a fish as bait and stronger nooses the sea eagle (*Cuncuma*) has been taken at times. See also 2 (a) (2).

6. The Fence with Snares. Ground-feeding birds such as doves and pigeons on meeting an obstruction such as a log or a low fence will seldom hop over but feed parallel with the fence until an opening is found. Bird trappers take advantage of this habit by constructing low fences, 8 to 12 inches high and 200 to 300 yards



41 42

Figs. 41, 42. THE IGOROTE LINGAN. SNARE SET IN FIG. 41, SPRUNG IN FIG. 42. (After Jenks.)

long, across the feeding grounds of such birds. Every 3 to 4 feet an opening is made in the fence over which is hung a simple snare or one attached to a spring such as those described in 2 (b) and 2 (c) above.

While collecting in the forest of Mindoro, McGregor was unable to shoot many specimens of the blood-breasted pigeon (*Gallicolumba*) due to their shyness and the denseness of the vegetation. A fence-and-snare trap was constructed on their feeding grounds, however, which yielded several individuals every day.

7. Igorote Simple Snare. This is a very simple device and consists merely of a slender bamboo withe on the entire length of which open horse-hair snares are tied in many planes. This is fastened in any bush or shrub that is a favorite perch of flocks of birds. In this way, in one day, I have seen an Igorote boy, who was guarding the ripening rice, catch eighteen weavers (*Munia*) and one marsh warbler (*Megalurus*), all of which were eaten.

8. The Igorote Lingan (figs. 41, 42). Reference to the photograph will show

the details of this trap, which utilizes the familiar principles of the spring snare on a perch constructed above the ground. Note that the noose is held up and open by delicate bamboo supporting sticks.

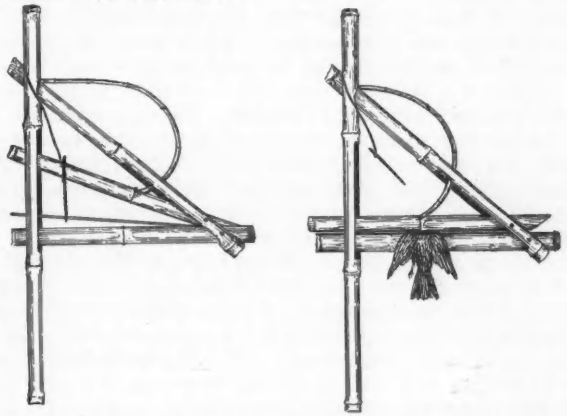


Fig. 43. THE LANDET, A SCISSORS TYPE OF TRAP. (After Culter.)

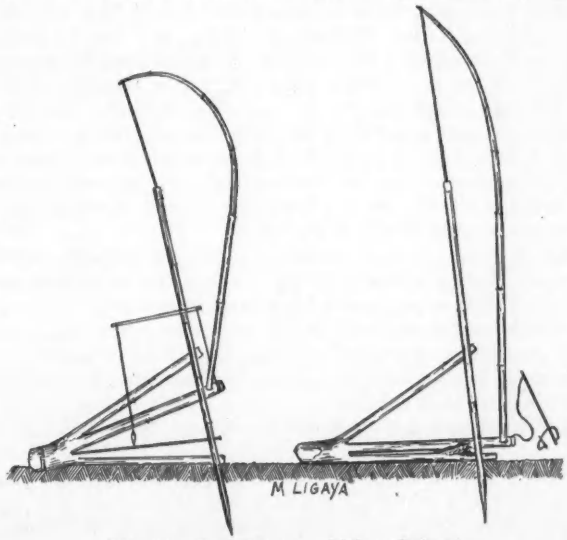


Fig. 44. THE ATIPIL. (After Culter.)

9. Scissors Type.[2] In this type of trap the principle of the spring trap is used. Instead of having the spring jerk up and close a noose, however, it is utilized to give a deadfall effect by closing the separated jaws of a bamboo trap which resemble a pair of shears. Figures 43 and 44 illustrate such a trap.

[2] Horace E. Culter, Filipino Traps, Philippine Craftsman, 5 (1916), p. 401.

10. Igorote Fire Lures. The only place we know of where this method is used is Balete Pass in the Caraballo Mountains of Luzon and at Kilometer 88 on the Haight's Trail. At Balete a long grassy valley ends in an abrupt vertical wall. In the face of this cliff small caves are dug. On the platform in front of the cave the Igorotes build fires and squat alongside. On foggy nights button quails and painted quails (*Turnix* and *Excalfactoria*) and migratory birds are attracted to, and fly through, the fires into the caves where they are trapped by the waiting Igorote. The lights from the fires, twinkling and flickering, seemingly suspended in the velvet blackness of the sky, make a picturesque sight from far down the wild dark valley.

11. Nets. (a) Seines are employed for the capture of shore birds and are utilized at night in two ways. (1) A net about 30 feet long and 5 feet wide with 3 inch meshes is carried by two men who walk with great circumspection towards a flock of shore birds asleep on a sand bar in the bay. This requires a caution and patience that only the Orient knows. When near enough these men stand fast, while a third, approaching from the water, frightens the birds into the net. (2) The net may be staked out near a flock, slightly inclined toward the birds. The men then approach from the water side and very cautiously drive the sleepy birds toward the net, ending with a sudden rush that sends the birds flying into the net.

The sand bars teem with myriads of water and shore birds and large numbers are captured with these nets. Among several dozens caught in one night near Obando on Manila Bay were knots, curlews, stints, and godwits.

(b) Button quail are caught with a scoop net from the back of a carabao. This requires a long-handled (15 to 20 feet) net with a 3 to 4-foot mouth and which is useful only on dark nights. The quail are flushed by the carabao, and on hearing the whip of the wings, the rider sweeps his net in that direction. A bird or two may be captured at a time.

(c) Snipe are caught in hundreds by the following method. On dark or foggy nights a lantern with reflector or a flash light is carried with a long-handled scoop net. Snipe feed at night in marshy meadows covered with short grass. The beam of light discloses the birds by the eyeshine or as they are walking and feeding. It is a simple matter to scoop them into the net.

(d) Great numbers of weavers (*Munia*) and Java sparrows (*Padda*) are sold on the streets of Manila. Most of these are caught by scoop nets as they go to roost in stands of wild sugar cane (*Saccharum spontaneum*). The cane is often black with these birds and one sweep of the net catches many.

(e) The Igorotes catch crossbills (*Loxia*) at night by climbing into the roost tree with lights and nets. Silvereyes (*Zosterops*) also are easily caught in this way, especially on foggy or stormy nights.

(f) Little birds that hide in bushes are secured by throwing a net over the bush.

12. Basket Traps. These are used in the nests primarily of *Merops* and *Munia*.

(a) For *Merops* a cylindrical basket, a foot or two long and slightly smaller in diameter than the tunnel in the bank where these birds nest, is pushed into the nest hole with the mouth of the basket outward. Bee-eaters returning to the nest enter the basket and are unable to turn around and escape. These birds are also captured on the nest by the use of a forked stick.

(b) For the weavers a hole is made in the top of the covered nest. The normal entrance is closed with a cylindrical basket with the mouth of the basket directed toward the interior of the nest. The returning bird enters by the new hole at the top and when frightened tries to escape by the normal exit.

13. Hook and Line. (a) Cattle egrets (*Bubulcus*), which are always associated with the carabao, are caught by means of a hook and line baited with a frog and attached to the tail of a carabao.

(b) Certain fish are caught by stretching a line over the water from which hang short lines and hooks baited with frogs that kick around on the surface of the water. *Porphyrio* (giant gallinule) is an accidental and occasional take on such lines.

14. Miscellaneous.

(a) Ducks, grebes, and coots are captured by wading into the flock at night with infinite patience and caution while the wader's head is disguised under a small raft of rushes and weeds. The ducks are grasped by the legs and pulled under water before they can struggle. If the water is too deep to wade several unhusked cocoanuts are tied together and used as buoys or water wings. A similar method is employed in the day time in Manchhar Lake in India where the fowler wears a duck skin cap or a tame cormorant or heron.[3]

(b) Bird lime made of the juice of the trees of the genus *Ficus* is used to catch some birds, especially the fruit and flower feeders such as silvereyes (*Zosterops*) and flowerpeckers (*Dicaeum*). When one bird is caught others are attracted by its distress.

(c) Caged decoys are used to lure certain species of birds. This is the method employed in the capture of the many bat, or hanging, parrakeets (*Loriculus*) offered for sale. In this way one of us caught three in his apartment in Manila without any difficulty and could have trapped more.

Sunbirds (*Cinnyris*) are often caught with bird lime, after which one male in a trap will lure many others.

(d) Igorote children are armed with a broomlike bundle of runo grass 7.5 feet long and one foot wide with which they protect the ripening rice from the birds. As the flocks fly over the field the boy sweeps his broom through them and rarely fails to knock down several birds.[4]

MARKET BIRDS

Since 1902, McGregor has kept records of birds found in the markets of Manila on numerous though not systematic visits. The list gives a conception of the diversity and abundance of birds captured by the means enumerated above. Due to a law for "the protection of game and fish" few wild birds have been sold in the markets in recent years and fewer records could be obtained. Birds are still extensively and openly sold, but by individual vendors and not so much in the markets where closer supervision is exercised.

The following list includes the names of all the species that were seen in the markets from 1902 to 1925. An asterisk indicates that the species is especially abundant and important as a market bird.

***Excalfactoria lineata** (Scopoli). From one to three hundred fifty or more painted quail on many days. A seasonal trend is evidenced; namely, January and February; and August, September and October.

***Turnix fasciata** (Temminck). This button quail was very common in the markets but not as abundant as *Excalfactoria*.

***Turnix ocellata** (Scopoli). This larger button quail was common, nearly equal in numbers to *T. fasciata*.

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[3] Salim A. Ali, Birding on the Manchhar Lake, Asia, 29 (July, 1929), p. 544.

[4] A. E. Jenks, *op. cit.*, p. 85.

Turnix whiteheadi Grant. Many recorded in September and October, 1913; a few scattered records for other months and years. Whitehead's button quail and Worcester's button quail are known only from market specimens.

Turnix worcesteri McGregor. Very rare; found twice only, August and September.

Dendrophassa axillaris (Bonaparte). From two to twenty-four Philippine green pigeons found during ten visits. Most of these were seen in August and September.

Dendrophassa vernans (Linnaeus). From two to thirty-five pink-necked green pigeons were found on four occasions, all in September.

Phapitreron leucotis (Temminck). From one to twenty-five northern white-eared pigeons were seen on eleven visits.

Leucotreron leclancheri (Bonaparte). One black-chinned fruit pigeon was found in 1913.

Pterocolpa carola (Bonaparte). Ten gray-breasted fruit pigeons were found in the market in 1904.

Macropygia tenuirostris Bonaparte. Large numbers of slender-billed cuckoo doves were on sale in 1903.

***Streptopelia dussumieri** (Temminck). This very common turtle dove was abundant in all months of the years.

OEnopopelia humilis (Temminck). The red turtle dove was found very commonly in lots of ten to sixty-two or more. None has been seen since 1916.

Geopelia striata (Linnaeus). The barred ground dove was numerous in 1903, and from one to twelve were noted on eleven visits since.

***Chalcophaps indica** (Linnaeus). From one to many bronze-winged doves on numerous occasions.

Gallicolumba luzonica (Scopoli). The bleeding-heart, or blood-breasted, dove is a popular cage bird. The Spanish name, puñalada, is better than any of the commonly employed English names for this species. On sixteen visits groups of from three to thirty of these pigeons were exposed for sale.

***Hypotaenidia philippensis** (Linnaeus). From one to fifteen pectoral rails were found on many visits.

Hypotaenidia striata (Linnaeus). From one to twenty blue-breasted rails were found on a considerable number of visits.

Hypotaenidia torquata (Linnaeus). From one to four Philippine rails were seen on many days.

Rallina eurizonoides (Lafresnaye). One or two banded crakes were found on nine occasions, all in the fall months, especially September.

Porzana plumbea (Gray). About eighty lead-colored crakes seen in 1902, none since.

Poliolimnas ocularis (Ingram). The ashy crake was seen once, two specimens.

Limnobaenus fuscus (Linnaeus). A few ruddy crakes found on eight occasions.

Gallinula chloropus (Linnaeus). The moorhen was numerous in 1903, from ten to thirty-five at a time, and scattered throughout other years.

Porphyrio pulverulentus Temminck. From two to eight giant gallinules found on three occasions.

Pluvialis fulvus (Gmelin). From four to twenty-five Pacific golden plovers on numbers of visits in October to February, inclusive, 1913-17.

Charadrius dubius Scopoli. Found twice, too numerous to count on one occasion.

Numenius variegatus (Scopoli). From six to sixty whimbrels seen on seven visits in September and October.

Mesoscolopax minutus (Gould). About a dozen pigmy curlews were seen in a market, once only.

Limosa baueri Naumann. Ten Pacific godwits seen in the markets in 1913.

Actitis hypoleucos (Linnaeus). One to six common sandpipers were found on several occasions at long intervals.

***Rhyacophilus glareola** (Linnaeus). The wood sandpiper was very common; sometimes as many as one hundred individuals on sale. None in the summer months.

Pisobia ruficollis (Pallas). Thirty little stints were seen in 1915.

***Capella megala** (Swinhoe). Swinhoe's snipe was found abundantly in the market from September to February, inclusive. There may have been one or two other species among the specimens recorded as *C. megala*, but this is by far the commonest Philippine snipe.

***Rostratula capensis** (Linnaeus). From one to thirty-one painted snipe were found on scattered observations in practically all months of the years. On two occasions in 1902 large numbers were seen.

Glareola orientalis Leach. One swallow plover in 1903.

Pyrrherodia manilensis (Meyen). One large heron in 1910.

Nycticorax nycticorax (Linnaeus). Twenty-two night herons seen in 1913, three in 1916.

Ixobrychus cinnamomeus (Gmelin). One cinnamon bittern in 1910 and six in 1911.

Nettapus coromandelianus (Gmelin). Three to twenty-five Indian dwarf geese were found on several occasions in 1903, 1914, and 1915.

Dendrocygna arcuata (Horsfield). Innumerable in March and July, 1903; twenty to thirty on three visits in 1915. The disappearance of the tree duck from the markets seems to point to an actual decline in the numbers of these fine birds in central Luzon. The junior author has taken and seen very few of them on hunting trips to the large lake (Laguna de Bay) near Manila during 1927 to 1929. McGregor found this was true on trips as long ago as 1916 to 1919.

Anas luzonica Fraser. From one to many Luzon mallards were found on thirteen visits.

Dafila acuta (Linnaeus). One pin-tail was seen in 1902. The species is rare in the Philippines.

Nettion crecca (Linnaeus). Twenty European teals found in 1915.

Querquedula querquedula (Linnaeus). Many blue-winged teals were found in 1915, a few in other years. Practically all of the market records are limited to January and February.

Spatula clypeata (Linnaeus). The shoveller is rare in the Philippines. One or two were found on seven visits to the markets.

Marila fuligula (Linnaeus). Some years ago the tufted duck could be seen in countless thousands in Laguna de Bay. From two to twenty-five, on one occasion many more, ducks of this species were found on sixteen visits to markets, all in December, January, and February.

Circus spilonotus Kaup. One Asiatic marsh hawk in 1904.

Circus melanoleucus (Pennant). One pied marsh hawk in 1904. This and the preceding note were made on the same day.

Tyto longimembris (Jerdon). One grass owl in 1923.

Cacatoes haematuropygia (P. L. S. Müller). Three cockatoos in 1924.

Tanygnathus lucionensis (Linnaeus). A few common green parrots seen in 1904.

***Loriculus philippensis** (P. L. S. Müller). Two to sixty or more colasisis, or hanging parrakeets, were noted on numerous visits.

Alcedo bengalensis Gmelin. Two in 1904.

Halcyon gularis (Kuhl). One white-throated kingfisher in 1910, five in 1913.

Halcyon chloris (Boddaert). One white-collared kingfisher in 1910.

Centropus viridis (Scopoli). Two red-winged coucals in 1911.

Centropus javanicus (Dumont). Two Javan coucals in 1904.

Pitta erythrogastra Temminck. The red-breasted pitta was found twice.

Pitta atricapilla Lesson. One or two black-headed pittas were seen on five visits.

Hirundo javanica Sparrman. Two Asiatic swallows in 1923.

Pycnonotus goiavier (Scopoli). From two to ten guava bulbuls were found on four visits.

Calliope calliope (Pallas). One rubythroat in February, 1904.

Zosterops meyeni Bonaparte. This silvereye is a common cage bird; from one to thirty-six were found at long intervals.

Dicaeum papuense (Gmelin). Three Philippine flower-peckers in 1915.

Dicaeum pygmaeum (Kittlitz). Two pigmy flower-peckers in 1923.

Cyrtostomus jugularis (Linnaeus). From one to twenty-two yellow-breasted sunbirds were seen on six occasions.

Leptocoma sperata (Linnaeus). From one to thirty-five red-breasted sunbirds were seen on fourteen occasions; commoner than the preceding species.

Anthus gustavi Swinhoe. Six Petchora pipits were seen with a red-throated pipit in 1917.

Anthus cervinus (Pallas). One red-throated pipit in November, 1917.

Alauda wattersi Swinhoe. Skylarks in the market were too numerous to count in 1902; twenty-four were noted in 1915.

Mirafra philippinensis Ramsay. Very many bushlarks were on sale in 1902, but only one has been noted since then.

***Padda oryzivora** (Linnaeus). Java sparrows are favorite cage birds and are sold in great numbers. They are found in the markets abundantly, but practically none is recorded for May, June, and July.

Amandava amandava (Linnaeus). One hundred in May, 1921; seventy in August, 1923.

***Munia cabanisi** Sharpe. Birds of this species are found commonly in the markets where they are offered in pairs in tiny woven-bamboo baskets.

***Munia jagori** Martens. This common weaver is very abundant in the markets and is sold in the same manner as the preceding.

Munia everetti (Tweeddale). Three and four Everett's weavers found twice.

Oriolus acrorhynchus Vigors. One to four specimens of this common, showy oriole were seen on five visits.

Lamprocorax panayensis (Scopoli). Six glossy starlings in 1904.

AEthiopsar cristatellus (Linnaeus). Few mynas in 1904; several small lots in June and August, 1910, some of which were young birds.

Sarcops calvus (Linnaeus). A few bald starlings, or coletos, were seen in 1904.

Manila, P. I., August 10, 1929.

THE SUMMER RESIDENT BIRDS OF THE BOREAL AND TRANSITION LIFE-ZONES OF MOUNT PINOS, CALIFORNIA

By ALDEN H. MILLER and SETH B. BENSON

Mount Pinos, lying at the southern end of the San Joaquin Valley, California, is separated from the Sierra Nevada to the northeast and the San Gabriel Mountains to the southeast by low passes not exceeding 4200 feet in elevation. The summit of the mountain rises to an elevation of 8826 feet. From the San Gabriel range southward through southern California, the mountain chain is continued, in order, by the San Bernardino, San Jacinto, Santa Rosa, and Cuyamaca mountains, each range being isolated by passes or by mountains of lower elevation. The Boreal and Transition life-zones of Mount Pinos encircle the summit, while below approximately the 6000-foot level are extensive areas of Upper and Lower Sonoran zones.

Grinnell (Auk, 22, 1905, pp. 378-391) has listed the birds encountered on Mount Pinos during a field trip conducted in June and July, 1904. Later, this list was used in a comparison of the numbers of Boreal and high Transition species occurring upon the summits of the various mountain peaks and ranges of southern California (Grinnell and Swarth, Univ. Calif. Publ. Zool., 10, pp. 383-392). Since the appearance of these lists several additional Boreal and Transition species have been noted during the breeding season on Mount Pinos and are to be given formal mention at the present time.

Field work on Mount Pinos has been undertaken by the present authors as follows: May 27 to 31, 1922, May 29 to 31, 1924, May 28 to June 1, 1926, May 27 to 30, 1927, and July 8 to 11, 1929, by the senior author; and May 24 to June 15 and July 1 to 3, 1929, by the junior author. Acknowledgment is due to Mr. A. J. van Rossem for contributing field notes accumulated by himself in the course of a number of field trips to the Mount Pinos region during the past ten years.

Cryptoglaux acadica. Saw-whet Owl. A foot and feathers of this owl, no. 54139, Mus. Vert. Zool., were found May 29, 1929, on a fallen log among yellow pines in a ravine on the eastern slope of the mountain, elevation 7800 feet. The fresh condition of the meat clinging to the bones indicated that the bird had been killed so recently as the preceding night.

Sphyrapicus varius daggetti. Sierra Nevada Red-breasted Sapsucker. Observed in May, 1924, on the southeast side of the mountain at about 6500 feet elevation. Later, a nest of young was found in the same vicinity by Laurence and Sidney Peyton. A few other individuals were seen during the late spring of the years 1924, 1926, and 1927.

Empidonax wrightii. Wright Flycatcher. Common summer resident, breeding in the ceanothus brush from 6500 feet elevation to near the summit of the mountain. A nest and a set of three fresh eggs were taken May 31, 1922, when also the parent birds were taken and identified by Mr. A. J. van Rossem. A breeding male, no. 54146, Mus. Vert. Zool., was collected June 11, 1929, in a patch of ceanothus at 8100 feet elevation. It also was identified by van Rossem.

Sitta canadensis. Red-breasted Nuthatch. A juvenile, no. 570, coll. A. H. Miller, was shot from a small group of the same species on July 10, 1929, in the fir timber on the north slope of the mountain, elevation 7500 feet. It seems certain that the individual taken was reared somewhere on the mountain.

Hylocichla guttata sequoiensis. Sierra Nevada Hermit Thrush. First observed by A. J. van Rossem in May, 1923. On June 10, 1929, and on several succeeding days, a Hermit Thrush was heard singing by van Rossem and the junior author in the fir timber. A bird was seen and heard in the same vicinity June 13, 1929.

Myadestes townsendi. Townsend Solitaire. A pair was seen June 8, 1929, on a rocky ridge on the steep north slope of the mountain at 8000 feet elevation. One of the pair was collected and proved to be an adult male, no. 54159, Mus. Vert. Zool., in breeding condition.

Regulus satrapa olivaceus. Western Golden-crowned Kinglet. Observed on the mountain wherever fir trees occurred. Between June 6 and June 13, 1929, these kinglets were seen daily. They were found in pairs and the enlarged gonads indicated that the breeding season was in progress. An adult, no. 54161, Mus. Vert. Zool., was collected June 6, 1929, and van Rossem obtained an adult male June 10, 1929. Also observed July 10, 1929, in the fir timber on the north slope, elevation 7500 feet.

Corthylio calendula cineraceus. Western Ruby-crowned Kinglet. First observed June 9, 1929, in fir timber on the north slope of the mountain, and heard and seen on succeeding days up to June 13. The birds were in full song. They were less numerous than the Golden-crowned Kinglets.

Of the list of thirty-one Boreal and high Transition species of birds given by Grinnell and Swarth (*loc. cit.*) as summer residents of the southern Sierra Nevada, with the above additions twenty-four are now known to occur on Mount Pinos whereas only seventeen were listed previously. (See accompanying table.) *Cryptoglaux* was not included in the list of thirty-one, but nevertheless is an interesting addition to the known Transition fauna.

In view of the thoroughgoing surveys conducted in the San Bernardino, San Jacinto, and Santa Rosa mountains, it seems likely that few, if any, more of these thirty-one species will be added to the present faunal lists of these mountain ranges. However, there is reason to expect that intensive work in the San Gabriel Mountains, which has been lacking to date, might increase the list from that mountain mass. Consequently, in the following comparisons of lists of species some reservation is felt concerning the San Gabriel Mountains, particularly in view of the degree to which the Mount Pinos list has been increased.

Mountain ranges in order of size of Boreal area	Mountain ranges in order of number of species of Boreal birds
Southern Sierra Nevada	Southern Sierra Nevada, 31 species
San Bernardino Mts.	San Bernardino Mts., 28 species
San Jacinto Mts.	Mt. Pinos, 24 species
San Gabriel Mts.	San Jacinto Mts., 22 species
Mt. Pinos	San Gabriel Mts., 17 species
Santa Rosa Mts.	Santa Rosa Mts., 11 species
Cuyamaca Mts.	Cuyamaca Mts., 7 species

Grinnell and Swarth postulated (*loc. cit.*) that the smaller the disconnected area of a given zone (or distribution area of any rank) the fewer the types which are persistent therein. This principle is well founded and widely applicable. However, another factor, namely, the relative proximity of detached faunal areas to the main or central area, may also be an active agent in influencing the composition of detached faunas. Working with the evidence available at the time, Grinnell and Swarth placed little importance upon this latter principle as operating in the southern California mountains. In dealing with birds we may suppose that the isolation of these southern California mountain ranges is not complete during the non-breeding season, albeit complete during spring and early summer. Isolation of disconnected areas, therefore, must to all intents be absolute before the factor of distance of disconnected area from the main faunal area can be entirely eliminated. To account for the large number of Boreal species on Mount Pinos we would resort to the explanation that Mount Pinos from time to time is restocked from the Boreal popu-

TABLE MODIFIED FROM THAT OF GRINNELL AND SWARTH SHOWING RELATIVE NUMBERS OF BOREAL AND HIGH TRANSITION BIRDS REPRESENTED ON THE DIFFERENT MOUNTAIN MASSES OF SOUTHERN CALIFORNIA

	Southern Sierra Nevada	Mt. Pinos	San Gabriel Mts.	San Bernardino Mts.	San Jacinto Mts.	Santa Rosa Mts.	Cuyamaca Mts.
Dendragapus obscurus howardi	x	x	–	–	–	–	–
Otus flammeolus flammeolus	x	–	–	x	–	–	–
Stellula calliope	x	x	x	x	x	–	–
Xenopicus albolarvatus albolarvatus	x	x	–	–	–	–	–
Xenopicus albolarvatus gravirostris	–	–	x	x	x	x	x
Sphyrapicus varius daggetti	x	x	–	x	x	–	–
Sphyrapicus thyroideus	x	–	–	x	x	–	–
Chordeiles virginianus hesperis	x	–	–	x	–	–	–
Empidonax wrightii	x	x	x	x	x	x	–
Nuttallornis mesoleucus majorinus	x	x	x	x	x	x	x
Cyanocitta stelleri frontalis	x	x	x	x	x	x	x
Nucifraga columbiana	x	x	x	x	x	x	–
Penthestes gambeli baileyi	x	x	x	x	x	x	x
Sitta canadensis	x	x	–	x	x	–	–
Sitta pygmaea melanotis	x	x	x	x	–	–	–
Sitta pygmaea leuconucha	–	–	–	–	x	x	x
Certhia familiaris zelotes	x	x	x	x	x	x	x
Turdus migratorius propinquus	x	x	x	x	–	–	–
Hylocichla guttata sequoiensis	x	x	–	x	–	–	–
Sialia currucoides	x	–	–	x	–	–	–
Myadestes townsendi	x	x	–	x	–	–	–
Regulus satrapa olivaceus	x	x	–	x	x	–	–
Corthylio calendula cineraceus	x	x	x	x	x	–	–
Dendroica auduboni auduboni	x	x	x	x	x	x	–
Carpodacus cassinii	x	x	x	x	x	–	–
Leucosticte tephrocotis dawsoni	x	–	–	–	–	–	–
Spinus pinus pinus	x	x	x	x	x	x	–
Loxia curvirostra bendirei	x	x	–	x	x	–	–
Oberholseria chlorura	x	x	x	x	x	–	–
Junco oreganus thurberi	x	x	x	x	x	x	x
Zonotrichia leucophrys leucophrys	x	–	–	–	–	–	–
Passerella iliaca stephensi	x	x	x	x	x	–	–
Melospiza lincolnii lincolnii	x	–	–	x	x	–	–
	31	24	17	28	22	11	7

lations in the southern Sierra Nevada. It should be noted that of all the major southern California mountains Mount Pinos is the closest to the main Sierran reservoir of Boreal populations. The catastrophes which might befall small separated populations on Mount Pinos would thus be compensated through relatively ready repopulation. This repopulation may be frequent only in the sense of geologic time intervals, or may occur every few years, dependent upon the vastly different conditions affecting the different species.

It should be noted that wherever subspecies occur in the Boreal species under consideration, in no case does the dividing line between subspecies pass between Mount Pinos and the southern Sierra Nevada. Thus, *Xenopicus albolarvatus alborlarvatus* and *Sitta pygmaea melanotis*, both northern races, are found in the Sierra Nevada and on Mount Pinos. *Dendragapus obscurus howardi, Passerella iliaca stephensi,* and *Penthestes gambeli baileyi* range as far north as southern Tulare County. Although specimens of these five species from the southern Sierra Nevada and Mount Pinos may show differences, in no case are such differences currently recognized as of subspecific value. This fact alone suggests a shifting or movement of populations sufficient occasionally to dilute any incipient subspecific divergence that might appear in a Mount Pinos population. In other species exhibiting no such slight differences, repopulation probably occurs more often, as for example, the Solitaire, Hermit Thrush, Red-breasted Nuthatch, Kinglets, Robin, etc., this group being characterized by a greater tendency to migrate and invade new territory than is to be seen in the case of the Grouse, Pigmy Nuthatch, or White-headed Woodpecker.

The possibility of repopulation of the mountain areas south of Mount Pinos, in general, must diminish inversely as the square of the distance from the Sierra Nevada. On the other hand, the spreading of populations would tend to concen-

trate along the chain of mountains rather than take place uniformly in all directions, thus materially increasing chances for repopulation, estimated on the basis of mathematical probability alone. Judging from the available lists of species, repopulation from the Sierra Boreal zone in most instances is of minor importance in the mountains south of Mount Pinos. However, the large San Bernardino Boreal zone may serve to replenish Boreal populations in the adjacent San Gabriel and San Jacinto mountains. The San Jacinto Mountains in turn may occasionally serve to repopulate the small area in the Santa Rosa Mountains. Nevertheless, it should be noted that the Pigmy Nuthatches in the San Bernardino Mountains and San Jacinto Mountains are considered as subspecifically distinct.

Mammals, being a far less mobile group than birds, are relatively well isolated in the various mountains under consideration. Chances for repopulation from the Sierra region are relatively slight. Consequently, Boreal mammals on Mount Pinos are few and correspond closely in numbers to the small size of the area.

Lastly, it should be emphasized that the above discussion only deals with average effects upon distribution. Ideally, the problem of persistence and maintenance of isolated populations should be solved for each species separately. Better than a zonal classification of species would be an analysis of smaller faunal associations; for it is likely that some of the species do not exist in the smaller areas because there is no place for them. Nevertheless, lacking data for such a detailed analysis, consideration of the foregoing generalizations seems justified.

Museum of Vertebrate Zoology, Berkeley, California, December 14, 1929.

PROBLEMS OF BIRD CONSERVATION IN CALIFORNIA

By JEAN M. LINSDALE*

Resolutions passed at the April, 1929, meeting of the Northern Division of the Cooper Ornithological Club (see Condor, XXXI, 1929, p. 139) furnished the stimulus for the preparation of the present report. The suggested outline of investigations which accompanied the resolutions has been followed closely both in making the detailed studies called for and in selecting the material for this presentation. In general, the inquiry has disclosed an abundance of facts which provide opportunities for worth-while work in bird conservation. At the same time it has revealed an increasing lack of concern, on the part of the Club members, about those problems which have to do with the continued welfare of our bird life.

STATUS OF NATIVE BIRD LIFE

An examination of available information bearing upon population numbers in California bird species reveals no single species which can be designated certainly as on the verge of extinction. However, several species, or groups of species, are low in numbers within the state so that they need watching and possibly help in maintaining their statuses.

Sage-hen: This bird in California is almost to or at the danger point in reduced numbers. Factors which we suspect as being especially important in hastening this decrease are as follows. Shooting of these birds in excess numbers has had serious effects in late years. Grazing of sheep up to the carrying capacity of the region occupied by the birds has been detrimental, especially since it involves disturbance at all the water holes in the territory. Finally, unfavorable weather during the nesting season, exemplified by the spring of 1929, on top of other, abnormal, factors, has helped to bring the numbers down. Here is a species that surely has been affected harmfully by improved means of transportation of hunters. However this factor is partially offset by the favorable attitude towards the birds on the part of the persons who live within their range. If the reduction continues much farther it will be too late to save this bird for California. The Cooper Club can render timely assistance to this species by starting and supporting a movement to establish a prolonged closed period for the Sage-hen.

Clapper Rails: Although various observers have indicated the nature of the agencies contributing to the depletion of numbers of these rails, it appears that reduction in area of habitat suited for occupancy is the chief factor. (See DeGroot, 1927.) A suitable course of action in this case would be to work for the maintenance of some salt marsh areas where this and other kinds of animals peculiar to those habitats might be preserved. This has been suggested at various times, but evidently the Cooper Club has not taken the matter seriously. Before many years it will likely be too late to do anything for these birds.

Shore-birds, Ducks, Geese: The status of this group of birds is possibly near a crisis as far as California is concerned. The interest shown by most Cooper Club members in these birds has been conspicuously passive. The future standing of this group in California is largely dependent upon the development of an active interest in its welfare. At the same time we must recognize that such practices as market

*Chairman of Bird Conservation Committee appointed by Northern Division President John G. Tyler in April, 1929. Other members appointed to this committee were Donald D. McLean and C. B. Lastreto. After the report was read at the December 7, 1929, meeting of the Northern Division it was adopted by unanimous vote. Two additional members, Joseph Dixon and Tracy I. Storer, were then appointed on this committee.

hunting, night hunting, over-sized bags, and live decoy hunting continue to have a large part in the reduction of this class of birds. These factors cannot be remedied easily so long as local sentiment favors transgression of existing laws. The working out of plans for the preservation of these birds should not be left to gun clubs alone and to persons interested in shooting.

Just now two opportunities are pressing for action by a few persons who care for the welfare of this class of birds. Both of them have to do with the provision of more extensive areas of habitat suited to the kinds of water birds which live all or part of the year in California.

Even though both our state and federal governments have within the past year passed laws to make available large sums of money for the establishment of wild fowl refuges, that action was only the beginning, in each case, of a long and complicated process. Much work must be accomplished before an adequate series of refuges is actually established and maintained. The situation is especially difficult in the California valleys, and these are just the places where the refuges are most needed.

It is granted that the state and federal authorities have made preliminary surveys of the likely areas in California and that so far no call for outside help has come to notice. However it seems certain that the Cooper Club membership has access to a great deal of information that would be of value to the persons who have the task of selecting the new refuges. Is it not possible for the Club to take up the problem of finding suitable lands for this purpose? We feel certain that any information leading to the selection of potential refuge land would be welcomed by either the Bureau of Biological Survey or the California Division of Fish and Game. Further, we think the chances are good that if field naturalists should turn their attention to this problem for a time it would result in a general stimulation of the establishment of refuges and that many benefits would result.

California Condor: The number of individuals of this species existing at present appears to be not certainly known. Nor are the causes for the decrease known definitely. There is little doubt but that Cooper Club members frequently have opportunity to contribute to the welfare of this species by discouraging the killing of birds and the taking of their eggs.

Prairie Falcon, Duck Hawk, White-tailed Kite, Red-bellied Hawk, Golden Eagle, Bald Eagle, Osprey: Our evidence (obtained from published sources, from questioning local observers, and from first hand acquaintance with the areas concerned) indicates that these birds are not in immediate danger of extinction in California but that the prospects are not good for their holding out unless our present attitude toward them is changed. It seems to be almost the universal opinion that raptorial birds should be killed off, and the species listed above appear particularly likely to suffer in California because their habitats are restricted in extent and consequently their numbers are always small. Any program to protect these birds should involve an effort to preserve as much as possible of the habitats now occupied.

Then, it would be desirable to campaign for the purpose of countering the general idea of the amount of damage done by these birds. It would be fair to advocate the limitation of killing to the actual individuals which do harm.

The problem of dealing with animals which prey upon other animals near their own size is one of the most serious questions in the whole conservation movement. Great masses of fact may be selected to support almost any thesis which a person chooses to defend. And in almost every instance an opposite contention may be built up with just as imposing background of facts. One common difficulty seems

to be the tendency to attempt to make too wide an application of conclusions which result from limited observations. Here is a problem which every bird student needs to work out independently. So much convincing but at the same time fallacious literature on the subject is being broadcast that it is hard to pick out the trustworthy portion. This Club could afford to take up this general problem for discussion at one or more of its meetings. Its members might then be better prepared to formulate and promote a consistent program for the conservation of all types of birds.

Yellow-billed Magpie: A study of all published records of its occurrence, and field observations over most of the range of the yellow-billed magpie, show that, although this bird is not now in any danger from too rapid reduction, a special watch should be kept over the species to see that an unmerited sentiment against the bird is not built up and that protection of it is not removed. This is probably the only Californian bird species which could be wholly wiped out by a well planned campaign in this state, for extermination. The Cooper Club should be prepared to forestall any such campaign if one ever should be started. Remember that once this species is gone there is no chance for restocking from outside territory.

Our evidence will justify no further statements now concerning the depletion of particular species or groups of species in California. It might be possible at some later time to assemble more complete information on this subject. Meanwhile we may approach the whole subject of bird populations from a different viewpoint, that is, the getting at an understanding of the general natural history principles concerned.

Here we urge that everyone who is interested in the welfare of the bird popution in California read Nicholson's "Birds in England" (reviewed in the Condor, XXXI, 1929, p. 135). We know of no other book which gives so fair and complete an evaluation of the factors which affect bird populations and which must be considered in bird protection work. We take for granted that every Cooper Club member has read and studied Dr. Grinnell's paper on "The Trend of Avian Populations in California" (Science, LVI, 1922, p. 671). Our investigation has confirmed the theme developed there so that in this presentation attention is directed chiefly to other phases of the situation.

Most of us are more or less familiar with the nature of the changes in bird life which accompany such of the activities of man as planting field crops, setting out orchards, lumbering, and heavy grazing. It has been the aim in drawing up the following paragraphs to determine and to present briefly and accurately a summary of such changes as they are taking place in California. Thus our local experiences may be interpreted roughly in terms of the whole area of the state.

With the above rough classification of some of the major types of area in the state before us and bearing in mind the kinds of changes which it indicates to have taken place, we may point out some accompanying features that affect importantly the bird life of the state. We will assume that all Cooper Club members are sufficiently acquainted with the bird species in the state and the more obvious factors in the local distribution of them to interpret these features in terms of their effects upon the bird life.

Out of the one-quarter of the state's area which might conceivably be cultivated, there has been scarcely any increase in amount actually farmed, during the last forty-five years. There has been some shifting in the areas actually in cultivation, but the total area farmed has remained at just about one-half the area avail-

able for that use. The most marked trends in farming have consisted in increasing the number of farms, cultivating more intensively, increasing production per acre, and adding more improvements (buildings, roads, lawns, trees, and the like). It has been estimated that in the closely settled irrigated communities the amount of unirrigated land varies from ten to forty percent of the gross area.

Further study of the situation which these facts represent forces the conclusion that for practically every species of land bird found originally living on this cultivatable land there remains a sufficient amount of land undisturbed by farming to forestall the immediate reduction of its numbers to the point where there is danger of extermination. It seems inconceivable that any one of the non-game birds which lived in these portions of the state would be forced to extinction because of limitation of habitat in the immediate future. Before this can happen some radical developments in the state's agriculture must be demanded and put into practice. Until

TABULATION OF SOME TYPES OF LAND AREA IN CALIFORNIA

	Acres
Land area of state	99,617,280[1]
Cultivatable land	23,000,000[2]
Land in farms	27,565,440[4]
Pasture land in 1924	16,907,167[4]
Crop land in 1924	8,402,195[4]
Field crops 1928	4,706,000[2]
Fruit crops 1928	1,670,391[2]
Vegetable crops 1928	357,240[2]
Potential irrigable land	18,000,000[3]
Area under irrigation, 1924	4,700,000[4]
Water supply available for	6,200,000[4]
Non-agricultural land	76,000,000
Original forested area	23,000,000[1]
Present forested area	18,270,000[1]
Present virgin timber	13,200,000[1]
20 National forests	19,164,573[1]
Grazing land in national forests	11,389,000[4]
4 National parks	1,188,480[1]
Present area in state parks	12,845[1]
Federal bird reservations (3)	95,560[5]
41 State game refuges	2,533,640[5]
14 Wilderness areas	1,493,500[6]

[1] American Tree Association, Forestry Almanac.
[2] Kaufman, 1929.
[3] Bailey, 1923.
[4] Ayres and Hutchinson, 1927.
[5] Bryant, H. C. (MS).
[6] California Fish and Game, 15, 1929, p. 154.

these take place our attention might be directed better to more pressing situations in bird preservation.

Next, let us turn to a brief consideration of the non-agricultural areas of the state. These make up close to three-fourths of the total area. Only one-third of this portion was originally in forest. There is left more than half the actual area of the state which never can be either forest or agricultural land. While grazing activities have been and are influencing the bird populations in these areas, these effects are more general and less injurious to birds than are human activities in the agricultural and forested areas. This situation is largely due to the topography, soil, and climate being so unfavorable for the usual kinds of human activity. It is to be pointed out that a large part of the early settlement of the state took place here and that later most of its human occupants withdrew. Another important consideration is that this area contains suitable habitats for large populations, in the aggregate, of nearly all those land birds that are being crowded out of the farmed areas.

It is important for the welfare of forest-inhabiting birds in this state that more than half the acreage of the original forested area is still standing as virgin timber. However, we must remember in this connection that the greatest number of species and the largest populations for a given unit of area are usually present on those areas where the original, uniform, stable nature of the vegetation has been disturbed so that a greater variety of habitat conditions now prevails. The birds that have suffered most reduction from human disturbance of forest land are the species which live around meadows, in the stream border thickets, and around the sources of the streams. In other words grazing and summer camping are the activities most destructive to birds in the forested areas.

The effects upon bird life of grazing are too intricate to be adequately treated here. One item to be considered is how extensive the grazing has been in forest lands; more than half the national forest area in California is classed as grazing land. Fortunately, the Forest Service has realized the possible dangers in grazing (to the practice itself), has exercised careful supervision, and in some cases even has closed areas to this practice. If it could be shown that existing grazing conditions are actually hindering the persistence of bird life in any particular area, the prospects appear favorable for obtaining corrective regulations on the part of forestry officials.

Turning our attention again to the whole area of the state, one phase of the stock industry in California calls for comment. While there has been a slight decrease in the number of cattle in the state in the past ten years, there are now 55 percent more sheep than there were in 1922. If these trends should continue the situation will almost certainly require some special effort to protect samples of the habitats of some of the birds which are affected. Considerable land formerly occupied by cattle has been turned to sheep. In many instances the grazing has been so close that all the forage was used up and the sheep had to be moved. It is easy to see how the native animal life might thus be crowded out.

The greatly stimulated interest resulting in the setting aside of land for the benefit of wild life including birds has been especially active in California. It is in connection with this general movement that, it seems to us, the Cooper Club has one of its most favorable opportunities to do effective conservation work. For the benefit of those members who may not have had opportunities to follow recent activities of this nature we will review the major ones of them briefly.

The sanctuaries provided by the extensive areas in national parks in California are continually threatened by over-zealous attempts to make them more accessible to the crowds of pleasure seekers which congregate there. We can help mantain the status of bird life in the parks by aiding the opposition to the demands to make vacation cities out of all the wilderness. Here is one situation which calls for immediate action by this Club. Several of the small mountain lakes in northeastern California provide the only nesting places for water birds of kinds that are represented in the state by only a few breeding pairs. These same lakes, by stocking with fish, providing suitable food, and extending one or two roads, can all be made attractive fishing resorts; in fact most of them have already been assigned to this fate. When the fishermen and their families arrive the birds leave and do not bring off broods of young that season. It is not too late to have some of these lakes, already within a national park, set aside for undisturbed occcupation by the birds. However, the present indications are that within a very few years, one or two, every lake in this area will have been made accessible and will be frequented by campers; not by occasional small parties, but by numbers as large as the available

parking space near them will permit. And all this is taking place without a single protest from any person interested in the welfare of birds.

The survey of California (Olmsted, 1929) carried on in 1928 by the state park commissioners provides a basis for carrying out a definite program of developing a state park system. A study of the published report upon this survey shows that, however thorough an analysis of the lands in the state has been made, the approach has been almost solely from the viewpoint of the landscape architect. No evidence can be detected that any special attempt has been made to select for consideration projects which might serve especially to preserve representative habitats of the native animal life. Should not this function be considered as having an importance equal to that of preserving distant scenery? Here is an opportunity for the Cooper Club to act now to make suggestions and possibly to exert influence for insuring that this phase of the parks situation be given consideration before final selections are made. Surely the report on the park survey merits careful study by Club members. Are the areas selected for favorable discussion as satisfactory from the viewpoint of bird preservation as some others which may be eliminated because they are slightly less favorable when judged by other standards?

Of the federal bird refuges in California we single out one for consideration now. The United States Department of Agriculture announced in October, 1928, that 10,300 acres in northern California had been set aside as a wild fowl refuge. In this mimeographed announcement we read that, "the layout of the area is such, due to mud conditions along the shores, that a natural refuge has existed in the northern part of the Tule Lake area, but sportsmen have in the past found their recreation on other portions of the area. In order not to mete out undue hardship to these sportsmen, it was deemed advisable to allow a continuance of hunting privileges on an area at the southern end of the lake, and accordingly the Secretary of Agriculture on October 10 approved an order permitting hunting on 2,800 acres. . . . The inviolate refuge, therefore, comprehends 7,500 acres of land extremely valuable for resting and feeding grounds for the birds which frequent the area." In other words, the refuge comprises that portion of the lake which was already inaccessible to hunters! Our preliminary findings indicate that this case should be looked into by this Club to see if it would not be justified in asking that the whole area be made a bona fide refuge.

California is fortunate in possessing so many extensive areas in state game refuges as it does. Even though all of these refuges have as their primary object the replenishing of the supply of large animals to be hunted outside their limits, it is to be expected that also the native and non-game species of birds living there will be benefited by this setting aside of land from the intrusion of hunters. From this viewpoint, then, there is justification for bird students to take an active interest in the maintenance of these refuges. For one thing, the question of prohibition or restriction of grazing by sheep within the refuges is one that bears importantly upon the effectiveness of the refuges. The fact that it has been found desirable recently to relocate entirely two of the refuges (1F and 4F) suggests that others might bear scrutiny to determine whether they have been placed in the most suitable locations. Possibly slight changes in the boundaries of some of these areas would benefit greatly the bird life of their vicinities.

We wish to call attention to the fourteen wilderness areas that have been set aside in California by the forest service in an effort to preserve at least a remnant of the frontier from destructive human influence. Here a definite portion of our avifauna will be saved from immediate disturbance "by the congregation of great

numbers of people who bring with them all the social and mechanical devices of our present-day civilization." The effectiveness of this action in providing bird preservation may be increased by our taking sufficient interest in it to learn more about the designated areas and then to make recommendation to the proper authorities for modifications or extensions in the system as established.

LAWS RELATING TO NON-GAME BIRDS

For the most part the status in California of particular species of non-game birds is not affected by their listing in the laws. The main point is that most birds are protected.

The most disappointing feature of this situation is that in past years while birds have been *added to* the list of outlawed species, one at a time, practically no remonstrance has arisen from the members of this Club either singly or collectively. If this reception of such legislative action reflects the feelings of Cooper Club members it must be concluded that these members are actually not concerned over the maintenance of the bird life of the state.

To cite one specific example, your committee has reason to believe that if the bird enthusiasts in California displayed a small portion, say fifty percent, of the quantity of interest and activity used up in the recently conducted campaign to choose a state bird, in a concerted effort to place the white pelican on the protected list of birds, they would succeed within one year. The weakened nesting colonies of the pelican call for and deserve protection fully as much as, if not more, than any single small species of song bird in the state. There are reliable and convincing facts in plenty to serve as basis for a campaign. The opposition to this bird is, we think, not strong and the few arguments put forward against it may be refuted easily. The only reason which presents itself to explain why this bird has been allowed to remain on the list of birds which may be killed, is simply that no persons have felt sufficiently concerned over the matter to make a really worthy effort in behalf of the bird. Meanwhile the species is being certainly reduced in numbers all over North America. Why has the Cooper Club taken no action?

BIRD PROTECTION BY LAWS

Our observations lead to the conclusion that usually farmers observe the non-game bird protection laws except in the case of hawks and owls, and in cases when they see, or think they see, damage to their crops. Fruit growers, we believe, in general, when they are troubled with bird pests, need help rather than criticism. While it may be true that fruit-eating by birds may help the industry, it will not help the individual grower whose location may be such as to attract great numbers of fruit-eating birds from surrounding areas. In other words we do not think this could be considered a satisfactory method of crop-production control.

Vacationists appear to affect bird life less directly than might be supposed at first thought. Of course there has been lately a tremendous increase in the number of persons leaving the cities in summer. However this seems to be more of a taking advantage of quick and far transportation facilities than of gratifying a desire to be in the woods. Hence the crowds are observed to stay on or close to roads and in camps or resorts. As a result, judging from the testimony of persons now living off the highway, and from examination of side-roads and trails now disused and remnants of towns and farms now deserted, there has been a withdrawal of men from a large part of the area of the state along with a concentration (both for permanent and vacation uses) on smaller but at the same time for them more favorable areas.

NECESSITY FOR EDUCATIONAL WORK

The time is at hand for a revision of the traditions upon which our system of bird protection has been developed. At first the appeal for birds was made upon basis of their "economic importance". The latter was very largely assumed. It had far less basis of fact than was alleged. Your committee is prepared to defend the view that birds should not be depended upon in any instances to save cultivated crops from damage by weeds or insects. Control measures, to be successful in combating crop pests, must be planned independently of feeding activities of birds. However, it is also true that individual birds are often accused of doing damage for which they are not responsible. It must be emphasized that these statements are meant to apply only in the cases of cultivated field and truck crops and of fruits. They do not necessarily hold in forests or pastures where native vegetation may predominate.

Now, it is *not necessary* to resort to such argumentation to convince people that we need to preserve our native animals.

If we read correctly the trend of general opinion, it has become the fashion all over the country to talk and to think conservation. One of the most certain indicators that this is the present situation is the response which it has brought forth in the advertising of some of our purely commercial enterprises. Why else would such a booklet as "The Preservation of Scenic Highways" be gotten up and distributed, but to profit by this lately developed feeling on the part of people in general?

The same feeling which demands the preservation of "natural beauties" will, we think, for the same reasons, demand the preservation and protection of bird life. Why then can not we accept a hint from the commercial advertiser and, following the lead of the Pennsylvania game commissioners (G. M. Sutton, 1927, p. 9), admit that the real reason we want birds protected is for the pleasure we derive from searching them out and watching them—in other words for the satisfaction of our own interests and the interests of others of similar inclinations?

If the Cooper Club membership is willing to agree upon such a basis for a program of bird protection it might expect even greater success than if it attempts to advance the previously used arguments that birds must be preserved because of their supposed value to someone else. It is not intended to suggest that the Cooper Club carry on a campaign to show that birds are not useful in terms of dollars and cents. But we do think this organization might well leave out the economic phase of the problem in any educational work which it now undertakes. Not only would the work then represent more sincerely our own attitudes, but a great many embarassing and perplexing problems which are continually arising might be left for solution to those organizations which are better fitted for working upon them than is our own.

For example, it seems that this Club might well leave to representatives of the state and federal governments the major portion of the task of devising some satisfactory means of counteracting the damaging effects of the fruit-eating activities of a few bird species.

So many agencies, in California, are at work giving out information on general nature subjects and upon birds in particular that, it seems to us, the limited resources of the Cooper Club might be put to more fruitful use than that of carrying on general education work. Our examination of the situation indicates, however, that there is an especial need for a certain type of educational work which this Club might itself best carry on.

First, we assume that our membership, compared with any other class of citizens in the state, has in its possession, or has means for acquiring, the greatest amount of, and the most trustworthy, facts concerning the bird population of the state. This includes knowledge of what species occur, what parts of the state they frequent, types of habitat frequented, and numbers and fluctuations in numbers. Further, the Club's membership contains a good number of persons whose training in biological thought fits them especially well for arriving at the general implications and principles to which these facts correctly lead. The most effective work in bird conservation, it appears to us, will result from well planned efforts to use these two resources of the Club—facts and training.

It seems hardly necessary, possibly it is not even desirable, to attempt to reach directly every citizen in the type of work we suggest. We can bring about more intensive and more widespread bird conservation if we can reach a small portion of the leaders in the state and convince them that our project is worthy. What we suggest is that the Cooper Club as an organization take advantage of every opportunity that arises to supply these leaders with reliable information and that it undertake to bring to their attention, in suitable manner, some of the more obvious principles which must be observed in preserving our native bird life.

The types of persons which it is most desirable to reach in such a campaign, as revealed in our investigation, are those leaders that have most to do with the administration of the land in the state and its resources and that have to do with legislation in the state. We suggest that concise and convincing statements be made up which give reliable information on phases of bird life which figure importantly in the problem of bird preservation. These might then be distributed at intervals to persons selected from groups such as the following:

Officers in the State Department of Conservation, especially the heads of the divisions and the deputy fish and game commissioners.

Officers of administration of state and national parks.

Heads of divisions in the State Department of Agriculture and especially all extension agents and county workers.

Owners and managers of the larger ranches and land companies.

Forest supervisors and officials of lumber companies.

Officers in sportsmen's organizations and managers of hunting clubs.

Members of legislative committees which consider proposed game laws.

FUTURE LEGISLATION

Rather than to attempt to carry on extensive and time-consuming campaigns for the purpose of influencing the trend of future legislation which might affect the bird-life of the state, our enquiry has shown that it would likely be more successful for the Cooper Club to deal with this problem in a simpler, more direct manner. In so far as we can analyze the situation the Club's chief hope for success in this type of undertaking is to delegate some one individual or small group of individuals to look out for the interests of bird-life at each legislative session. Such an individual would need to possess, at least in part, qualities such as the following:

A genuine and unselfish interest in promoting the preservation of our bird life.

Sufficient sympathy with the aims and ideals of the Club to work in harmony with its general conservation program.

Resources of such a nature that he could spend at least a part of each legislative session in Sacramento.

Experience in routine employed by our state legislature sufficient to enable him to detect the trends of treatment of bills affecting birds, before the legislature.

If there is no person on the rolls of the Club, prepared and willing, to perform such tasks, then we think an effort should be made to find one among the conservationists outside the Club and invite him to become a member. No action of the Cooper Club could have its full success in influencing legislation unless it is based upon a clear understanding of the happenings in Sacramento. The best way we can think of for obtaining this understanding is for the Club to have some volunteer representative on the ground actually to determine what is going on. With this representative's reports at hand the Club would have a basis for concentrating its efforts where and when they are most needed.

Judging from the happenings of the past few years the most important legislation affecting wild life is not always the widely advertised and well known bill but is often some inconspicuous phrase or "rider" which may be scarcely detected by citizens in general until months after the law has passed. The detection of these important points at the proper time for action is work for a representative of the type we have suggested.

Just now a course of action is open to the Club which might well supplement or even replace the one outlined for keeping in touch with wild life legislation. The Associated Sportsmen's Clubs of California founded an organization in 1925 whose first announced policy was that of "cooperation with all genuine state and national conservation organizations and agencies." In October, 1929, there were 127 member clubs. There is no question but that this group has exerted an important influence upon recently enacted wild life legislation in the state.

The Cooper Club has accepted an invitation to affiliate with these clubs and an agent has been appointed to represent it at meetings. Our scrutiny of the situation reveals as favorable an opportunity as the Club could hope for to become acquainted with or to exert helpful influence upon important conservation work. However, a continued attitude of aloofness toward this enterprise on the part of Cooper Club members may result in a marked detriment to the gain that has been made already for bird protection in California. It is time now for us to become acquainted with the aims and powers of this newly formed association.

OUTING LICENSE

With respect to the feasibility of instituting some form of outing license, nothing of promise has come from our consideration. The following comments are offered for the purpose of stimulating discussion of the subject. In support of the proposition it may be argued that: Holders of such a license might take on a more sincere interest in the out-of-doors; some of the more obnoxious forms of outdoor amusement might be curtailed; greater respect for the cause of conservation might be instilled into license holders; huge funds of money would be available for conservation work. Contrarily it may be said that: There is no immediate need for the money that such a license would provide; more money is available now for conservation uses than is being expended wisely; there is no way to prevent the sportsman from contributing to this license as well as his regular hunting license; no organization is prepared to administer such an undertaking; there is no insurance that the aims instituted by the Cooper Club would continue to be the aims of a movement to establish an outing license.

In conclusion, the suggestion is offered that this organization, the Cooper Ornithological Club, first decide whether or not it desires to carry on active work in bird conservation. If an affirmative decision is reached a next step would be to make a canvass of the Club membership to determine which persons are willing

to spend time in the work. These members might then be assorted by localities and by interests and a committee made up that would be willing to work on an active and coordinated plan.

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FURTHER BIRD REMAINS FROM THE UPPER SAN PEDRO PLEISTOCENE

WITH ONE ILLUSTRATION

By LOYE MILLER

My first visit to the San Pedro formation was in company with Dr. Frank C. Clark of Los Angeles who had taken fragments of bird bones while screening the matrix for fossil shells. To Dr. Clark, then, is due the discovery of San Pedro as a bird-bearing horizon. Arnold's Memoir (Arnold, R., Mem. Calif. Acad. Sci., 3, 1903, p. 346) mentions fish remains, but not those of birds. Dr. Arnold in conversation told me that he had sent some vertebrate remains to the United States National Museum for identification. Among them he thought there were some birds, but I examined this material several years later while in Washington and found nothing ascribable to the class Aves.

Several week-end visits were made to San Pedro with Dr. Clark, and then the Museum of Paleontology of the University of California appropriated a small fund to employ a laborer for screening the matrix in our search for vertebrates. Accordingly, a young student of the Los Angeles Seminary, Mr. Morris Parker, spent three weeks at the work, camping on top of the hill which has since been eaten up by the steam shovel and converted into water-front real estate in the tremendous development of the San Pedro Harbor district. The results of this early exploration were discussed in a bulletin (Miller, L., Univ. Calif. Publ., Bull. Dept. Geol. Sci., 8, 1914, pp. 31-38) which recorded fourteen species of birds.

During the last six or eight years I have used what is left of the original hill exposure for field observation by a large class in elementary paleontology, visiting the site each fall. On each visit a premium has been placed on vertebrate remains, and out of the tons of molluscan fossils hurriedly looked over there have been assembled some interesting vertebrates.

Sting rays are fairly common, as already reported by Arnold. A goodly number of fragments from testudinate shells comparable to the common mud turtle have been collected. Sea lion, horse, bison, camel, saber-tooth, ground sloth, elephant, rodent, and whale are some of the mammals represented, while five additional species of birds are now to be recorded—a new segment (femur) of the skeleton of *Chendytes lawi* is made known, and the first fossil gull from the state of California makes its appearance.

Very positive emphasis is also given to the anomalies in the Upper San Pedro fauna. Pholas-drilled stones with the shells still present, giant long-necked clams with valves still fitted together, urchins, rays, sea lions and whales, all seem appropriate enough to a marine deposit, but there is only one solitary bone of a gull. Scoters, two shearwaters, cormorants, Western Grebes, loons, and two albatrosses are proper associates; but whence came three specimens of quail, the Meadowlark, Turkey Vulture, and Bald Eagle? Add to these the elephant, mud turtle, camel, sloth and bison, and the ecologic picture is a bit confused.

A shallow-water marine association with estuarine, fluviatile and sand dune admixtures is the only plausible explanation of such a combination. There were probably slight crustal movements up and down with comparative frequency so as to bring all within a narrow vertical range in the deposits and utterly destroy any regularity of stratification.

The picture drawn upon my own mind is not greatly different from that at

Point Mugu, Ventura County, today, where I have repeatedly combed the beach in close contact with ocean, lagoon, grass land, rocky point, and fresh water tule marsh, and where the fauna includes Raccoon, Harbor Seal, Bald Eagle, Cañon Wren, Townsend Warbler, Rhinoceros Auklet, and American Egret, not to mention other anomalies.

Aechmophorus occidentalis (Lawrence). The surprising fact in connection with this species is that it has not been taken in these beds earlier and more abundantly. The strand today receives a multitude of their bodies cast up by the winter tides. Only two bones have been collected, an almost complete humerus and a distal fragment of the same segment. The more perfect specimen is slightly larger than the Recent birds available for comparison.

Larus glaucescens Naumann. A single tarsometatarsus, perfect except for the proximal articular surface, was collected by one of my students this fall. It conforms in detail and dimensions with the Recent species, and constitutes the first record of a fossil longipennine from the state of California. In a previous note (Condor, **26**, Sept., 1924, pp. 173-174) comment was made on the anomalous distribution of gulls during Pleistocene time. This single specimen out of some hundred thousand taken from the fourteen or fifteen California horizons does not markedly affect the interest of that discussion[1].

Diomedea, sp. The single specimen formerly reported from San Pedro was approximately the size of *Diomedea nigripes*, being slightly larger. A second and fragmentary specimen of a tarsometatarsus is now available which almost equals in size the great *Diomedea exulans*, being slightly smaller. A series of tarsi of *D. exulans* is extremely hard to assemble, but two specimens taken from discarded museum skins show very slight variation in size, quite opposite to what one would expect in any species approaching gigantism. The Short-tailed and the Yellow-nosed albatrosses are not available for study. The shell middens of the California Indians produce the remains of a large albatross, but unfortunately there are no specimens of the tarsus in the collection.

Puffinus griseus (Gmelin). A perfect carpometacarpus represents this species, the second shearwater recorded from the San Pedro. The genus has persisted so consistently from the Miocene of Lompoc that one is not surprised at finding two of the Recent species in Pleistocene strata.

Phalacrocorax near **penicillatus** (Brandt). A fragmentary tarsometatarsus may be assigned to this category already tentatively recorded on the basis of a poorly preserved femur.

Anas platyrhynchos Linnaeus. A carpometacarpus, an ulna, a fragmentary humerus, and a fragmentary coracoid increase the representation of this species four-fold. It is interesting to note that this non-maritime duck is represented by five specimens and *Nettion* by four, while the one larine species yields but a single bone. These ducks serve to emphasize the fresh water factor in the accumulation of the Upper San Pedro.

Oidemia perspicillata (Linnaeus). The occurrence of this species, previously announced on the basis of humerus and coracoid, is further strengthened by the proximal end of a humerus.

Chendytes lawi L. H. Miller. This extinct anserine was first made known (Condor, 27, July, 1925, pp. 145-147) from the Santa Monica exposure of the

[1] Since this paper went to press, Dr. Hildegarde Howard has called to my attention a single fragment of a humerus, undoubtedly of some species of *Larus*, that she found in the Rancho La Brea collection at the Los Angeles Museum.

Upper San Pedro, and the description was based on the tibiotarsus and the tarsometatarsus. Two years later, a member of our field class at the Lumber Yard Station (of Arnold's monograph) picked up a complete tarsometatarsus that corresponds in every detail with the cotype from Santa Monica. Since that time four additional specimens representing tarsus and femur have been added to the collections from Santa Monica and from the Lumber Yard, one of them again being donated by Dr. Frank C. Clark. The femur is assigned to the same species as the type specimens purely on the basis of its size and its osteologic characters, for there is only the remotest association in the deposit. All specimens are from the rather haphazard accumulation of a strand and dune deposit.

Fig. 45. FEMUR OF *Chendytes lawi*, APPROXIMATELY × 1, VIEWED FROM THE EXTERIOR AND THE POSTERIOR ASPECTS.

The femur is smaller than the largest race of *Branta canadensis* and is almost exactly equal to *Chen hyperboreus*. From all the geese it differs in the marked curvature of the shaft in both longitudinal planes. Here again is noticeable the similarity to the diving ducks (*Oidemia*) that suggested the generic name. The trochanteric area is suggestive of *Oidemia*, the popliteal area is of maximum depth, and the muscular scar of the gastrocnemius and plantaris is pronounced and reaches one-third the way up the shaft. Here again is a marked resemblance to the diving ducks, but there is a decided difference in that this scar turns backward in *Chendytes*, and spirals to a point on the median line of the shaft at the linea aspera. Other active diving ducks, such as *Erismatura*, show the same tendency to attach the muscles farther up the femur. Altogether the evidence seems to warrant assigning these femora to the same specific category as the type and cotype of *Chendytes*.

Lophortyx californica (Shaw.) It is rather interesting to find a perfect humerus of this species to add to the coracoid and fragment of humerus previously reported. Some brushy area in the near vicinity, or not too far up stream, must have harbored these birds.

Haliaeëtus leucocephalus (Linnaeus). A single coracoid, almost complete, represents this "beach comber" eagle. I have repeatedly observed this bird along the sand spit at Point Mugu near Hueneme, California, where a strand accumulation is building up that strongly resembles parts of the Upper San Pedro.

University of California at Los Angeles, December 18, 1929.

FROM FIELD AND STUDY

Watermelon as Warbler Food.—It is our custom to maintain pieces of ripe watermelon on a window food-ledge during the summer and early autumn. Many species of birds partake greedily of the red pulp, and occasionally even a dainty warbler finds it attractive.

On September 1, 2, and 3, 1928, a male Yellow Warbler (*Dendroica aestiva*, subsp.), in new autumn plumage, spent the whole of each day at or near the ledge, dividing his time between the branches of the surrounding shrubs and the watermelon. He ate the red pulp with apparent eagerness and delight, coming every few minutes for a few bites. That the warbler did eat the pulp was easily seen from the window, as bits of red were "masticated" before swallowing and at such times were glimpsed between his mandibles. A tiny rock pool a few feet away could have satisfied his thirst, had unflavored water sufficed.

On September 27, 28, and 29, 1929, another warbler duplicated the performance, except that it seemed less attentive to the watermelon in the afternoons, when the ledge and surrounding shrubbery were in shade. Fortunately, bird skins were available and when I laid specimens of Yellow (female), Tennessee, and Lutescent Warblers on the window sill a few inches from the live warbler, and the repeated returns of the latter gave ample opportunity for comparison, its identity as a Tennessee Warbler (*Vermivora peregrina*) seemed positive. It agreed in every detail with a female specimen of this species taken by me on Septembr 17, 1896, at Madison, Wisconsin: smoked line through the eye under a pale superciliary, greenish color tones dorsally, ventrally paler with whitish belly, absence of conspicuous edgings on wings, evenly-tapered acute beak.

During one of the absences of the Tennessee Warbler, as an experiment, I substituted halves of ripe tomato for the watermelon, pulling the pieces of the latter farther back on the ledge. On its next return, after a moment's hesitation, the bird thrust its beak into the cut side of the tomato and ate a bit of its pulp and then took another bite before apparently realizing the difference. Pausing, it spied the watermelon and went to it, and after that, so far as we saw, paid no further attention to the tomato.

It seems a safe surmise that neither of these warblers had encountered watermelon pulp before. So far as I know none of our American warblers have the watermelon habit. Perhaps, though, the adaptation is not involved. Birds are quick to detect the glisten of globules of water, which beckon to their thirst. A trial drink does the rest, when it is of watermelon and the bird is a warbler. And because sipping is too slow, when the food is so good, the warbler bites off the pulp to crush out the juice in its throat. But it does seem a little strange that the taste sense of a warbler to which bitter (?) worms and bitterer (??) spiders and gnats are prime delicacies, should find instant delight in the sweetness of watermelon. Perhaps there are specific palatal differentiations as between the sweet and the bitter worms. Will some one please come forward and taste worms?—J. EUGENE LAW, *Altadena, California, October 10, 1929.*

Prodigious Drillings of a Williamson Sapsucker.—On the morning of October 13, 1929, we discovered a young male Williamson Sapsucker (*Sphyrapicus thyroideus*) in the pine wood near the Indian Caves, Yosemite Valley. When first seen the bird was at work drilling a hole in the bark of a great yellow pine. He was a shy bird and when we approached the tree where he was at work he flew to another tree some fifty yards away. After we chased him around through the tree-tops for some time we returned to the tree where he was first seen that we might make a study of the work done. Having had previous experience with sapsuckers of different sorts we knew them to be tremendous workers; still, we were amazed by the prodigious amount of work that had here been accomplished.

The tree in which the Williamson Sapsucker had staked his winter claim was a yellow pine which measured ten feet in circumference five feet above the ground. It was, perhaps, 150 years old and the bark was almost an inch thick. For seventy-five feet the trunk was quite free from limbs, nor were there any scars of old branches. There was, however, a series of concentric welts at intervals of from

two to four feet, and these swellings we presumed were caused by the healing over of ancient sapsucker drillings. From the bulging rings that distorted the normal symmetry of the shaft we judged that the tree had in decades past been sorely wounded by the ancestors of the bird that today harassed it.

Besides the evidence of ancient sapsucker work there were scars of more recent date. Scattered upward over a distance of some 90 or 100 feet there were many old pock-marks, these being the prospect holes of a Williamson Sapsucker that worked on the tree during the month of December, 1925.

Now we shall consider the fresh work (see fig. 46). The first series of drillings, five feet above the ground, contained 22 holes. Some of these holes were oozing sap, others were partly choked with congealed pitch. Four feet above these cuttings was another patch of sap-pits. This second area of checkerboard work ran parallel to the trunk, it was seven inches wide, eighteen high, and contained 121 sap-pits. Above the great patch of "sapcomb", and within a distance of ten feet, there were three more workings which averaged fifty holes each. In the five major projects,

Fig. 46. FRESH DRILLINGS OF WILLIAMSON SAPSUCKER IN YELLOW PINE IN YOSEMITE VALLEY, AS DESCRIBED IN TEXT.

and without considering the scattered drillings, there were close to 300 fresh sap-pits. Now all this was the work of a few weeks at most, and I am inclined to believe that it was really the work of a few days because it is not likely that a Williamson Sapsucker would be found in the Yosemite Valley before October 1. (Our earliest record previous to this is October 29, 1923.) Also on the last day of September we twice passed this tree and on that day nothing unusual was noted.

The sap-pits averaged ⅞ inch in depth. They were rectangular in shape, ¼ inch wide by 11/16 inch long, with the greatest measurement across the trunk. They were so closely bunched perpendicularly that seven pits were included in a space of 2½ inches, and side by side, the long way of the cutting, two pits were included in a space of less than two inches. With the sap-pits so thickly clustered the partitions between them were necessarily thin. The whole pattern resembled a section of coarse honeycomb tripe.

The plan of drillings would seem to indicate the workings of an abnormal bird. With so many tiers of holes one above another it would be quite impossible for a bird to drain the sap pockets without getting his whole underbody smeared with pitch. No single sapsucker could manage to keep such a vast number of holes open. At the time of our examination there was an excessive flow of sap from the main workings. All of the holes were bleeding and the lower tiers of pockets were overflowing. More sap was flowing than could be stored or consumed.—CHARLES W. MICHAEL, *Yosemite, California, December 1, 1929.*

Winter Nesting of the California Linnet.—On the afternoon of November 24, 1929, I found a nest of the California Linnet (*Carpodacus mexicanus frontalis*) in the neighborhood of Walnut Creek, Contra Costa County, California. I was attracted first to the nest by the male, in full breeding plumage, which showed concern about my presence near the corner of a house. Then the female linnet flew out from a climbing rose as I approached. In the nest were four eggs still warm from incubation. The nest was empty when examined on December 5, eleven days after it was found.—PHILBRICK SMITH, *Oakland, California, December 11, 1929.*

California Spotted Owl in San Diego County, California.—In these days, when ever-increasing numbers of campers and hunters leave practically no areas secure from human intrusion, with its possible effect upon natural life, it may be well from time to time to record the continued existence of bird species in localities where there is danger of their extermination. In this connection it is a pleasure to note that the California Spotted Owl (*Strix occidentalis occidentalis*) still persists in the limited wooded area on Palomar Mountain, San Diego County, California, in spite of changing conditions due to "cabin-site" and other "resort" activities. On August 17, 1929, Tennant Brooks, a young naturalist camping on Palomar Mountain, collected a Spotted Owl (evidently a bird of the year), which he attempted to mount. He later presented it to the San Diego Society of Natural History. It has been remounted and placed on exhibition in the Society's museum, as part of the "Identification Series of San Diego County Birds." To the writer's knowledge, no other record of a Spotted Owl from San Diego County has come to the notice of the San Diego Society of Natural History in at least ten years.—CLINTON G. ABBOTT, *San Diego Society of Natural History, San Diego, California, December 11, 1929.*

Vermilion Flycatcher on the Pacific Slope of Southern California.—The occurrence of the Vermilion Flycatcher (*Pyrocephalus rubinus mexicanus*) in the vicinity of El Monte, Los Angeles County, California, where willow association predominates, appears to be more frequent than is supposed. On January 27, 1923, I collected an adult male which was darting from the top of a half-dead willow and feeding on insects over water.

Again, on October 11, 1924, an immature male was collected. This individual was the only one which was readily approached, the others, being quite "nervous", and would fly for some distance, constantly out of gun range.

An adult male was observed on October 20, 1927, but it remained at too great a distance from the observer and was not procured. In the first week of December of the same year, a female was seen but was unfortunately lost in thick undergrowth after having been shot. The fifth bird of this species noted, an adult male, was shot on December 19, 1929, after a hot chase among the willows and surrounding fields.

It is my belief that the Vermilion Flycatcher is a rare but annual fall and winter visitant in this locality, as all five birds were observed within a radius of about a quarter of a mile. Two of the specimens obtained are now in my collection and the third was given to the late O. W. Howard.—J. STUART ROWLEY, *Alhambra, California, January 3, 1930.*

Notes on the Golden Eagle in Southern California.—The Golden Eagle (*Aquila chrysaëtos*), has always received much attention from bird students who have been fortunate enough to have the opportunity to observe it. There is thus a great mass of published data concerning its nests and life history. In going through my notes

I have found a few items of interest which are new or at least not frequently recorded. The observations were made in southern California and most of them pertain to a single pair of birds or to the birds in different years around one nest on a shelf of rock.

When I was a small boy, over forty years ago, I was living in Banning and was thrilled by accounts of a nest reported to be far back in the mountains. It was thus a real pleasure often to visit this nest in later years and get an account of its history. Absolutely authentic reports given to me show that the nest was in use for at least half a century. At first, sets of eggs were taken by different collectors without bothering the birds and the final end to its history came when either an earthquake or a heavy snowfall caused the nest and shelf of rock to fall to the cañon below. This has been the fate of a number of other nests that I have had under observation, but I feel sure that none of these others was in use for fifty years.

On March 10, 1919, I was able to watch a bird turn the eggs in the nest. This was done with her beak while standing up with both eggs between her feet. The nest at this time had no green twigs in it such as it usually had.

The birds started to make repairs to the nest in January, 1922, and I timed nest building operations as follows: 10:47 a. m., bird went to nest without material; 10:49, left nest; 10:50, swooped to green bush, apparently to get green twigs but seemed to miss; 10:51, to nest with dry twigs from the hillside; 10:53, left nest and swooped at same green bush but seemed again to miss; 10:54, to nest but seemed to be without material and after working there until 11:07 finally pushed rock or other substance from it; 11:08, left nest, sailed away, and disappeared in the distance.

On February 16, the birds were soaring over the hills near the nest and at 11:33 a. m. one went to hillside, secured some brush, and took it to the nest in its talons, arriving there at 11:34; after working for ten minutes it left and then after three minutes returned again but seemed to be without material; then made several minute trips back and forth from nest to hillside before settling down in nest. A man told me that bird was still carrying material on March 3, the day before I found an egg in the nest.

Although the nesting site was visited a number of times in January and February of 1923, only a single bird was observed. There was, however, a set of two eggs in the nest on February 24, when I flushed a bird from the nest. This bird could work pretty fast at nest building, as the following record indicates: 4:16 p. m., bird observed going to nest with stick in beak; 4:17, left nest; 4:19, returned to nest; 4:19½, left nest; 4:22, sailed by nest but did not go to it; 4:23, returned from the south with such a large piece of brush that it was hard to manage; 4:23½, left nest; 4:24½, returned to nest, descending from high above it; 4:26, left nest; 4:27, returned with stick; 4:29, left nest; 4:30, returned to nest from the north with stick; 4:31, left nest; 4:33, returned from the south over the nest and descended to it from the north; 4:37, left nest; 4:47, sailed over nest and then on out of sight in the distance.

Both birds were working at the nest on February 19, 1924, female on nest working material; 12:03 p. m., male arrived at nest with paper in talons; 12:04, male left nest, soared high overhead, made sweeping dive at green bush (12:06) and then into nest; 12:07, male left nest and returned again at 12:10 with something in beak; male left nest and perched on cliff 100 yards from nest; 12:28, female left nest where she had been working continuously and perched on rocks 20 feet from male; 12:29, male flew over to a perch beside female and then copulation took place much the same as with domestic chickens; male then perched beside female; 12:33, female left perch, soared overhead, and then into the distance and out of sight by 12:40; five minutes later male left and sailed away in same direction.

I found both birds present on February 23; male going toward nest and then swooping down toward same; 12:49 p. m., female came from cliff, or possibly nest; 12:50, both soaring clockwise high overhead and mounting higher and higher, the male being the higher of the two; 12:52, female started off toward the west and male followed, soon both out of sight; 12:53, both soaring in distance; 12:55, both soaring high overhead, anti-clockwise; 12:57, both out of sight. Such soaring is

sometimes done with one bird going clockwise and the other anti-clockwise and at this season of the year followed by copulation, the female making a dive to a perch on rocks near the nest, followed by the male at full speed. At this season the birds sometimes conduct flight antics over the nest such as swooping toward it from high elevations and making loop-the-loop flights. March 6, the birds were still at work and on March 13 the nest contained two eggs.

Both birds were noticed perched on rocks above the nest on January 2, 1929. This was the first time that they had been seen since May of 1928. The first material was taken to the nest on January 6, and the nest building and flying antics continued through the balance of the month and most of February.

No birds seemed to be around on February 23, so I visited the nest and was surprised to flush one from it. The nest seemed to be ready for eggs; cup of fine twigs and good inner lining of fresh green twigs. The bird flew away and was seen no more that day. On March 2, I again flushed the bird and found a single egg, and on March 7 it flushed again from the same egg. I removed this with the idea of seeing how long it would be before another set would be deposited.

The time between the two sets seems to have been about a month for on April 8, I flushed the bird from a set of two eggs. The bird was joined by its mate in soaring around near-by, which was an unusual action. The cup of the nest had a new lining of fresh green grass and green twigs. The birds were seen about the nesting site in April, May, and June, but they have not been seen since then.

A friend saw a bird sitting on a nest in May one year and, being anxious to get some photographs of some young eagles, I visited the site shortly afterwards. When I got within ten feet of the nest and on a level with it I was surprised to see that the bird was still "sitting tight". I was afraid the bird would knock me off the cliff if I went any closer, so I yelled, waved my hat, and studied her at close range. She ruffled her feathers, opened her beak, and acted much the same as a sitting chicken that is disturbed. When she finally flew away I was amazed to find an empty nest. A visit a couple of weeks later showed the nest still empty but no birds in evidence.

Nests with complete sets of eggs that I have personally examined in southern California have had only one egg in 35 percent of the cases, two eggs in 60 percent and three eggs in 5 percent. The average weight of 31 eggs which I was able to weigh was 141.4 grams; the largest egg, 176.59 grams, and the smallest, 113.87 grams; both extremes were sets of single eggs. I have a set of a single egg which I collected in 1914, that is smaller than any of the eggs that I have weighed.

It is my opinion that the Golden Eagle is a decidedly beneficial bird. Remains of food in their nests would indicate that the ground squirrel is the chief food and rabbits second. I have never seen any first-hand evidence that would indicate that eagles destroy birds, poultry, or domestic animals. This fine bird should receive our full protection; too many are being caught in traps, or shot as "large chicken hawks."—WILSON C. HANNA, *Colton, California, January 4, 1930.*

Notes on the Dowell Bird Collection.—On August 26, 1929, during a brief visit at the home of Overton Dowell, Jr., in western Lane County, Oregon, I took the opportunity to look over his private collection of local bird skins collected mainly in the vicinity of his home. Among the 700 or more beautifully prepared specimens, there were a few of unusual interest, especially in view of the collecting locality, which is in the pure coast Humid Transition Zone. Those of special interest are as follows.

Horned Puffin (*Fratercula corniculata*). In view of the few records of the occurrence of this northern migrant in Oregon, it was interesting to find two beautiful adult skins, male and female, found dead on the ocean beach near Mercer, Lane County, Oregon, on March 15, 1919, by Mr. Dowell, who states that their plumage was oil-soaked when he found them.

Marbeled Murrelet (*Brachyramphus marmoratus*). A small immature male just out of the downy stage, with a wing measurement of 108 millimeters. This specimen was picked up dead in the road along the upper North Fork of the Siuslaw River about six miles inland from the Heceta Head Lighthouse on the coast of Lane County, Oregon, on September 8, 1918, by a Mr. A. B. Johnson, who gave the bird in the flesh to Mr. Dowell. So far as known by the writer, and to Dr. H. C. Oberholser

who recently saw the specimen, this is the youngest individual of the Marbled Murrelet yet collected, and it is doubtful if it had reached a sufficient age to have flown far from where it hatched.

Anthony Green Heron (*Butorides virescens anthonyi*). The Dowell collection contains the skin of an adult male of this species taken at Mercer Lake, Lane County, Oregon, on July 11, 1923. Although this heron had been recorded previously (Condor, XXX, 1928, p. 129) in the state on the strength of sight records, this skin in the Dowell collection is believed to be the first of the species ever actually collected in the state of Oregon.

Golden Plover (*Pluvialis dominica dominica*). An immature male taken on October 6, 1918, by Mr. Dowell on the ocean beach three miles west of Mercer, Lane County, Oregon, adds one more record to the few known occurrences of the species along our coast.

Northern Spotted Owl (*Strix occidentalis caurina*). This species is of sufficient rarity anywhere in Oregon to justify the placing on record of all specimens known to be preserved in collections. An adult female in the Dowell collection was taken on the Siuslaw River, four miles south of Mercer, Lane County, Oregon, on March 13, 1925.

Nevada Cowbird (*Molothrus ater artemisiae*). One of the surprises found in the Dowell collection was an immature bird of the year of this species, a male, taken on the Dowell Ranch at Mercer Lake, Lane County, Oregon, on August 18, 1925. This constitutes the first record of this species known to the writer west of the Cascade Mountains in Oregon and was without doubt a straggler from its regular habitat in the arid Upper Sonoran Zone of eastern Oregon.

Mr. Dowell has kindly given me permission to place the above notes and specimens on record.—STANLEY G. JEWETT, *Portland, Oregon, October 31, 1929.*

Horned Owl Attacks Chickens.—At four o'clock, on the morning of November 16, 1929, I was awakened by something disturbing a hen with small chickens that was roosting in a small wire coop in my yard. I suspected a coyote, got out of bed and grabbed my shotgun, which was in the corner ready for emergency, and looked out the window. The moon was bright and I could see all over the yard. Nothing was in sight and I was almost ready to go back to bed, when I heard something leave the roof of a near-by shed and saw the owl sail down and strike the wire coop at the corner where the hen and her chicks were roosting. The owl stayed on the ground and I immediately shot and killed it, also killing the hen and two of her chicks.

I sent the owl to Mr. George Willett at the Los Angeles Museum, who, on comparing it with the series there, says that it is a Western Horned Owl (*Bubo virginianus pallescens*). He also states that this is the second record of this subspecies for the coast district of California. In the Condor (XVII, 1915, p. 206) Wright M. Pierce records a specimen taken in San Antonio Cañon. The owl was a large female and is now number 16684 in the collection of the Los Angeles Museum.—SIDNEY B. PEYTON, *Fillmore, California, December 4, 1929.*

An Unusual Case of Mimicry by a Catbird.—The most interesting instances of mimicry in bird songs that have come to my attention occurred near Fortine, Montana, during the past summer (1929) when a Catbird (*Dumetella carolinensis*) repeatedly imitated in its entirety the song, and later the song and flight, of the Bobolink (*Dolichonyx oryzivorus*).

The Bobolink, which seems slowly to be extending its Montana range westward as formerly-forested land is being brought under cultivation, does not yet occur in Lincoln County. A wandering male bird that appeared at our ranch on May 31 of this year probably was the first one ever to sing in that vicinity. It arrived alone, and sang almost continuously throughout the day. The following morning a few songs were given, and then the bird disappeared. A month later it again visited the ranch for three days (July 1, 2, and 3), sang a few times each day, and then disappeared again, to be seen no more during the season. (I presume this bird to have been the one that was observed earlier in the summer, as it fre-

quented the same small area within the farm, and, with hundreds of fence posts from which to choose, selected for a landing perch the same post used during the first visit.)

For at least half an hour during the morning of May 31, when the Bobolink first arrived, a Catbird from a near-by brushy flat perched on fence posts near the flying Bobolink and mimicked its song. At I watched and listened, three features of the Catbird's singing especially interested me. In many of its imitations it repeated the entire song of the Bobolink, without introducing distinctly foreign notes or phrases. This is contrary to accepted knowledge of bird mimicry. ("In no case does a bird mimic the whole repertoire of another but introduces into its own performance notes here and there that are copied from other species." Aretas A. Saunders, *Bird Song*, New York State Mus. Handbook 7, 1929, p. 82.) Although the Catbird did not reproduce correctly time and pitch throughout the song, the distinctive, pleasing quality of the Bobolink's singing was copied almost unbelievably well. The third interesting feature of the performance was the persistence of the Catbird in repeating the imitation so many times, without the interspersion of other singing; and there was a marked "enthusiasm" with which the song was mimicked. Its behavior in this regard strongly suggested an artistic appreciation of the song, to which it listened probably for the first time.

The Catbird was not present the next morning when the Bobolink sang a few times; nor was an imitation of the song heard at any time during the Bobolink's second visit, a month later. Although nearly every day during the summer I worked within hearing distance of the brushy flats on our ranch where about twenty-five pairs of Catbirds nested, after that first morning I did not hear an imitation of the Bobolink's song until fifty-two days later.

About nine o'clock on the evening of July 22, while at a favorite observation spot amid a jungle of brush in the Catbirds' territory, I was suddenly astonished to hear near-by what sounded like a typical flight song of a Bobolink. Turning toward the source of the song, I could discern only two Catbirds half hidden among dense willows. After a few seconds one of them flew out and upward until it reached a height of about thirty feet above the brush; then, while descending at an angle, its flight slow and jerky, but not fluttering, it gave a strikingly realistic rendition of a Bobolink's flight song. I waited there until dark, but the performance was not repeated. At no time during the remainder of the summer did I hear any further attempt to reproduce this song.

This case of combined song and flight mimicry is the only one I have ever noted in the Catbird. Perhaps to observers of wider experience, however, this behavior is not entirely unknown.

Presumably, the Catbird that gave the Bobolink's song on July 22 was the same one that mimicked the singing Bobolink on May 31. No proof of this assumption, but merely theoretical support, can be offered. Catbirds had been present for ten days before the Bobolink arrived, their migration seeming to have ceased; young were still being fed at the later date. And the nearest resident Bobolinks were at least sixty miles southeastward, in an entirely different type of country. But whether one individual, or two, did the singing, these instances of mimicry seem to me noteworthy because of the unusual features of each already described.—WINTON WEYDEMEYER, *Fortine, Montana, September 30, 1929.*

Drilling Habits of the Flicker.—The propensity of the flicker (*Colaptes*) for drilling holes in unusual positions is well known. A rather amusing instance of this habit was told me lately. My informant, who is a grain elevator agent in a near-by town was passing by a box-car loaded with wheat ready for shipment, when he noticed a heap of some ten bushels of grain on the ground below. It was the work of a flicker, which had been busy on the side of the car.

In two instances, of late years, I have noted one of these woodpeckers nesting in a hole in a cut bank overlooking the river. According to Dawson in his *Birds of California* the Red-shafted Flicker occasionally chooses such a site; our birds are, of course, mostly Hybrid Flickers, and have to depend mainly on telegraph poles for nesting purposes, now that most of the dead timber in the woods has disappeared. —LAURENCE B. POTTER, *Eastend, Saskatchewan, January 6, 1930.*

Breeding Record of Pacific Godwit.—Among sets of eggs recently added to my collection there is one of the Pacific Godwit (*Limosa lapponica baueri*). It consists of three eggs collected by an Eskimo girl in July, 1928, on the Ashookto River about 100 miles southeast of Barrow, Alaska. The nest was on dry ground away from the water and was composed of dry root fibers and moss of reddish color. Both the male and female were snared at the nest and are now (nos. 42956-57) in the collection of Dr. Louis B. Bishop, Pasadena, California.—WILSON C. HANNA, *Colton, California, November 14, 1929.*

Two More Victims of the Cowbird.—Two species can be added to those listed by Friedmann (*The Cowbirds*, 1929) as hosts of the Cowbird (*Molothrus ater*) in any of its various races. Both of these instances were recorded at Azusa, California, in the territory of the Dwarf Cowbird (*M. a. obscurus*).

In 1927 I found a Green-backed Goldfinch (*Astragalinus psaltria hesperophilus*) incubating three of its own eggs and one of the cowbird's. The eggs were later abandoned before they had hatched.

In June, 1928, I observed an almost full-grown cowbird following, and being fed by, a pair of Black-tailed Gnatcatchers (*Polioptila californica*). This latter species is one of the very smallest birds known to be successfully parasitized by the Cowbird.—ROBERT S. WOODS, *Azusa, California, December 3, 1929.*

Some Night Observations on the Western Horned Owl.—During the winter of 1928-29, two Western Horned Owls (*Bubo virginianus pallescens*) were repeatedly observed to be ranging along a cottonwood-bordered creek a few miles east of Aurora, Colorado. In the months of January and February they occupied widely separate parts of their territory, and neither had any regular roosting place. One of the owls was unusually dark, dusky predominating in the plumage, and was rather fearless for a bird of this species, not flying until a person was within 100 feet or closer. The other bird was of a distinctly lighter coloration, having the normal amount of buffy for this variety, and was much more fearful. From later observations it was concluded that the former was a female and the latter a male.

From the latter part of February onward, the female showed an attachment to a certain dense group of trees, always roosting in one of them during the day, and often not flying until the observer was directly beneath its perch. Since December, hooting had been heard, and on March 16, 1929, the female was heard to call at intervals of one-half to three minutes for one and one-half hours during the late afternoon.

There were eleven Magpie nests, varying in age and degree of dilapidation, in the locality preferred by the owl. On March 23, the female was sitting on one of the oldest of these, about 25 feet from the ground, in a tree located on the southern edge of the timber. After nightfall the nest was watched from behind a fallen tree about 200 feet distant. At 7:35 p. m., the male came to the nest and a conversation of deep *whoo-whoo's* followed, lasting for ten seconds or more. Also one of the birds uttered a shrill *chee-chee-chee* call. Then, after flying from tree to tree in the vicinity of the nest for a few minutes, the male departed.

A single young owl was hatched during the third week of April. From numerous observations made in the daytime, it was evident that the dark-plumaged bird did all of the incubating.

On the night of April 27, the female was hovering the young. At 7:00 p. m. a muffled *chee-chee* began coming from the nest, with, occasionally, a harsh rasping note. After about five minutes, the mother owl arose, stood on the edge of the nest for a second, and then flew away over an open field to the south, uttering the rasping call as she went. The notes of the young bird became louder and more continuous, resembling the cheeping of a young chick. At 8:05 p. m. the mother returned, evidently with some small article of food, for the owlet was silent from then on. The mother bird remained silently hovering the young until observation was discontinued an hour later.

On May 23, the ear tufts and wing feathers of the owlet were well developed. At 9:30 p. m. the mother owl appeared on the nest, where she and the young were

quite active, picking and tearing at some food. At 9:43, the parent flew to a branch nearby and was there when I left an hour later.

The parent owls made no visits to the nest on the night of May 27 during observations from 7 to 9 p. m.

While watching the nest May 28, one of the parents was seen to alight on it at about 9:00 p. m. What took place there could not be discerned because of darkness, and the only sound heard was a snapping of the beak. After a few minutes the adult flew off down the creek. The young owl called after it with a rasping *peerahhh*, and the parent answered by the same note. This calling and replying continued for about five minutes, the sounds varying in length and sharpness, sometimes amounting to a scream. A parent once uttered a whistling *whee-whee* note. A short period of silence passed and then both parents were heard in a tree near the nest, holding a confused conversation, one uttering the *whoo* and the other giving *erreeuh* calls accompanied by a loud snapping of the beak. The latter was evidently the female, since it flew to the nest a few minutes later, after the other left, uttering the same calls, and showing the usual tameness when I walked close to the tree. Another of her calls was a series of sharp *tchi-tchi-tchi* sounds, ending in a harsh screech.

The nest was watched from 8:00 to 10:00 p. m. on the nights of May 30 and June 5, but no activity was detected on account of the foliage having become dense and the wind preventing hearing.

The young owl left the nest on June 6. With its parents it remained in the nesting territory for over a month. By June 24, it was the equal of the parents in power of flight. A trait that I had not observed before in these birds was their roosting among the grasses and weeds on the damp ground below the trees during the hot days of June. Once one was observed to return to the ground a few minutes after the observer had withdrawn.

From the foregoing observations, it would seem that the horned owls have as great a variety of call notes as some of our more easily observed diurnal birds.—LEON KELSO, *Aurora, Colorado, November 16, 1929.*

Migratory Flight of Swainson Hawks.—In Bird-Lore (XXI, 1910, p. 147) I recorded a flight of Swainson Hawks (*Buteo swainsoni*) seen at Buena Park, California, on April 8 and 9, 1909. Since that times the species has been observed here on April 8, 1910, when four birds were seen; on March 16, 1918, a large flock; and on May 8, 1926, two birds. At 6:30 a. m., April 1, 1929, several large hawks were noticed flying over some open pasture land near my home, and taking my field glasses I went to a place where I had a clear view; in about twenty minutes I had counted twenty-five Swainson Hawks, scattered over an area of about forty acres. Some were on the ground, some on fence posts and others in the air, soaring in ascending spirals, and, after gaining considerable elevation, gliding away to the northwest on set wings. The same day, between 11:50 a. m. and 12:20 p. m., twenty-three more Swainson Hawks were seen on some open pasture lands near Cypress, California, about three miles to the southwest of the place of earlier observation. At this time there was a strong southwest breeze blowing from the ocean and the birds gave some interesting demonstrations of soaring flight. As in the early morning these birds were gliding away to the northwest as they reached an elevation estimated to be about a thousand feet.

Some of these birds lingered in the locality, or were replaced by other birds from the south, as, on April 2, three were seen; April 3, seven; April 8, fifteen; April 9, ten; April 10, four; April 12, ten; April 13, four; April 15, five; April 16, three; April 25, one; and on April 29, two. With a strong breeze blowing the birds would rise from the ground or from a fence post and soaring to a height of 100 feet or more would head into the wind and hover in one spot for a long time, with only a slight flexing of the wings and a spreading of the tail to keep them in equilibrium, as they searched the ground below for food. If prey was sighted, they dropped to the ground, but if none was seen they would glide to another location and hover again.

Of all the birds seen during this migration, only one, seen on April 1, was in very dark plumage, the others all being in varying degrees of the light phase.—JOHN MCB. ROBERTSON, *Buena Park, California, October 27, 1929.*

Notes from the Vicinity of San Francisco Mountain, Arizona.—It was the privilege of the writer, through the invitation of, and in company with, Joseph W. Sefton, Jr., President of the San Diego Society of Natural History, to spend a fortnight collecting in the higher mountains of northern Arizona during June, 1929. Headquarters were established in Flagstaff, whence points of interest were visited each day, after an early start by automobile. The greater part of our time was spent at Little Spring, on the north base of San Francisco Mountain.

This spot has historic interest to naturalists, by reason of the records made there by Dr. C. Hart Merriam in 1889. It was as a result of his field work on this mountain that he first announced the modern conception of Life Zones. Many new forms of mammals were described from the region about San Francisco Mountain by this now venerable naturalist, and owing to the character and remoteness of the place little change has occurred since he drove his tent pegs "in a grove of aspens and pines on a knoll just northwest of the spring," for his base camp forty years ago. (See North American Fauna, No. 3, 1890, p. 3.) Too little is the consideration given by present day zoologists to these notable areas where early workers combatted adverse conditions of both supplies and transportation.

While the time spent by the writer at Little Spring was decidedly limited, being only five days, much of the summer bird life recorded by Merriam was found. The only specimen of exceptional interest was an Arizona Spotted Owl (*Strix occidentalis lucida*) collected by Mr. Sefton on June 20. This bird was perched in an aspen tree, where the limbs of near-by firs were closely interlocked, making a dense tangle. The specimen, prepared by the writer, proved to be an adult female and is now number 12397, collection of the San Diego Society of Natural History. The crop and stomach were both empty. This record apparently extends the range of *S. o. lucida* considerably to the northward.

Another place visited during our short stay in the region was Oak Creek. This locality lies some 18 miles south-southwest of Flagstaff and is in the lower limits of the yellow pine belt. While yellow pines were the conspicuous trees on the cañon sides, alders and junipers were prominent along the cañon floor and creek bed. Here, at an altitude of approximately 5250 feet, we collected, on June 24, breeding specimens of both Red-faced Warblers (*Cardellina rubrifrons*) and Painted Redstarts (*Setophaga picta*). Mearns reported these birds from the Mogollon Mountains (Auk, VII, 1890, p. 261), and our record adds another, and somewhat more northerly, locality. —LAURENCE M. HUEY, *San Diego Society of Natural History, San Diego, California, December 10, 1929.*

Say Phoebe Nesting in Western Montana.—On April 12, 1929, it was reported to me that an unidentified flycatcher which had been seen in Missoula in the spring of 1928, had returned. May 11, it and its mate were definitely identified as Say Phoebes (*Sayornis saya*). On that date one or both birds were seen carrying nesting material and the nest was discovered. It was a high, bulky affair placed on a horizontal beam under the eaves of a dwelling in the outskirts of the town. On June 7 both parents were seen carrying food to the nest.

In "A Distributional List of the Birds of Montana" by Aretas A. Saunders, this bird is reported as unknown west of the continental divide. In the Condor (XXIX, 1927, p. 159), Winton Weydemeyer of Libby, Montana, reports having observed for several minutes a Say Phoebe in the outskirts of Libby on July 20, 1924.

This present report from Missoula seems, then, to be the first record of a Say Phoebe nesting in Montana west of the continental divide.—CAROLINE WELLS, *Missoula, Montana, December 27, 1929.*

A Second Nesting Record of the Pacific Harlequin Duck in Oregon.—In the Condor (XXVII, 1925, p. 241) the writer published what is believed to be the first recorded instance of the nesting of the Pacific Harlequin Duck (*Histrionicus histrionicus pacificus*) in the state of Oregon. Nothing more was learned regarding the breeding range of this species until July 29, 1929. On that day, while I was riding along the trail near the source of the Imnaha River in the Wallowa National Forest at

an altitude of about 8,000 feet, my attention was drawn to a number of small ducklings bobbing and bouncing along the course of the clear, swift and icy-cold stream below the trail. (See fig. 47.)

Hastily dismounting, I headed the birds off on their swift, down-stream course and found that the brood consisted of an adult female and her family of five large downy young. Even when the family was approached to within twelve or fifteen feet, the mother refused to fly off and leave her young, but always tried to escape by swimming swiftly up or down stream. The young were equally adept at breasting

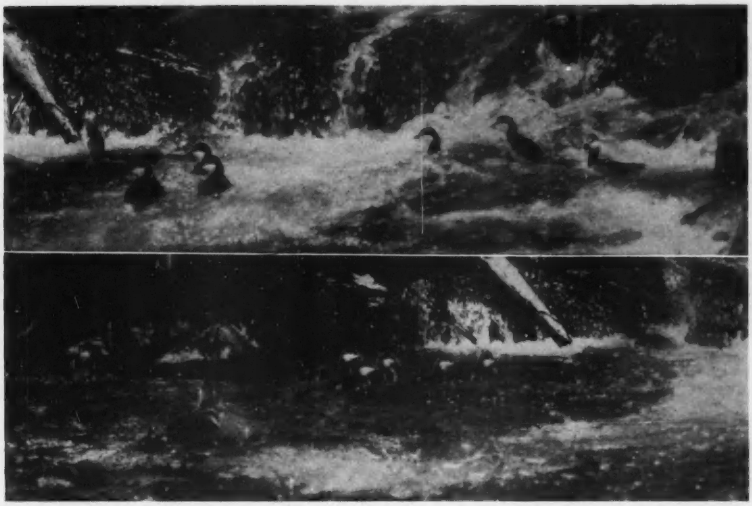

Fig. 47. PACIFIC HARLEQUIN DUCKS (TWO VIEWS); PARENT WITH FIVE YOUNG. IMNAHA RIVER, WALLOWA NATIONAL FOREST, WALLOWA MOUNTAINS, OREGON; JULY 29, 1929.

Photographed by Major John D. Guthrie.

the swift current. After photographing the family, I left them in peace on their rushing torrent amid the towering peaks of the Wallowa Mountains.—STANLEY G. JEWETT, *Portland, Oregon, October 11, 1929.*

Wasp Eaten by a Mockingbird.—The common yellow-and-brown wasp (*Polistes*) has, in addition to its formidable sting, a hard, tough armor which makes it difficult to kill. Having previously noticed the discreet attitude assumed by the California Thrasher (*Toxostoma redivivum*) upon encountering this insect at a drinking-place, it was with some surprise that, on the morning of October 21, I saw that a Mockingbird (*Mimus polyglottos leucopterus*) had captured a good-sized individual, which was still buzzing angrily. The Mockingbird dealt with the wasp vigorously, though with circumspection, and finally swallowed it piecemeal.—ROBERT S. WOODS, *Azusa, California, December 3, 1929.*

Wire-perching Woodpeckers.—The ease with which certain woodpeckers can perch on wires has been observed only lately by me, in spite of a lifetime of "bird-watching." I recently recorded this ability on the part of a Lewis Woodpecker (Condor, XXXI, 1929, p. 252) in the belief that it was perhaps something unusual. In the early part of September, 1929, I was staying at "The Willows," a resort about 35 miles east of San Diego, where a grove of live-oaks is passed by the pole-bordered highway to El Centro. Here the California Woodpeckers (*Balanosphyra formicivora bairdi*) daily used the electric wires as perches both for resting and as a vantage

point from which to hawk for insects. Not infrequently more than one bird might be seen perched on the same wire between two poles. Adults and young-of-the-year seemed equally disposed to make use of the wires. It is therefore evident that wire-perching is no unusual feat for woodpeckers of the genera *Asyndesmus* and *Balanosphyra*, to which *Melanerpes* should probably be added. Perhaps *Colaptes* can stand on a wire, but I am still inclined to question whether other, more definitely "tree-trunk," groups of woodpeckers are capable of so doing. Observations of others on this score would be of interest.—CLINTON G. ABBOTT, *San Diego Society of Natural History, San Diego, California, December 10, 1929.*

Observations on the Dwarf Cowbird.—During the time from 1920 to 1929 it has been interesting to note the apparent increase of the Dwarf Cowbird (*Molothrus ater obscurus*) in southern California. In 1920, the sight of a cowbird in the willow thickets of the San Gabriel River district and adjacent semi-arid washes was not common, and eggs were found only occasionally. Up to 1925, my records failed to show the finding of cowbird eggs in nests of any other species but California Yellow Warbler and San Diego Song Sparrow.

In 1926, I was able to get into this district but once during the nesting season. I found cowbirds flying about, in mating antics, in considerable "bunches" as compared with the season of 1920. During that one-day trip through the willows, I noted several California Yellow Warbler nests which contained cowbird's eggs, and I collected one of this warbler, the female of which was incubating, as a true maternal instinct urges, upon three eggs of the cowbird and not a single one of her own! These three eggs are, without a doubt, from the same cowbird as they are practically identical in shape, color, and size. What a delightful time the yellow warblers would have had supplying the demands of three such hungry ruffians!

In 1927, during the months of April and May, I found cowbird eggs in a much wider variety of nests, and it was about five o'clock on a May afternoon that I was extremely fortunate actually to see the performance of a female cowbird when she steals the opportunity to do the famous "sneak stunt" which carries on the race.

I was sitting beneath a sycamore taking a little rest, looking at an Arizona Hooded Oriole (*Icterus cucullatus nelsoni*) nest which was swung about twenty feet up, near-by. The female oriole was sitting on eggs at the time and was on the nest while I sat there, somewhat concealed by shrubbery. For some reason, she flew off the nest, probably to find a bit of food before darkness fell, and disappeared in the surrounding bushes. A few minutes after the oriole left the nest, a female Dwarf Cowbird flew quietly down from another part of the sycamore tree under which I was sitting, and scrambled into the oriole nest. To me, it seemed as though the affair was pre-arranged or timed by clock, for there certainly was no time lost in getting on the nest.

The total time the cowbird remained on the nest could not have exceeded two or three minutes. During this time she laid her egg, either kicked out, or with the use of her bill, removed one of the oriole's eggs, and was gone. The thing happened in such quick time that I hardly had time to see whether she took the oriole egg out of the nest before she laid her egg, or afterwards. However, I know there was an egg removed to make room for this "parasite", because I found the oriole egg where it was dropped.

In the course of a few minutes, the female oriole returned to her incubating duties, evidently unmindful of the fact that a radical change had been made in her household, a change which she probably would never discover, although the young cowbird would eventually be twice the size of her own young, and with about double the food capacity. This occurrence I have never seen since, and probably is a sight that one will witness only once in a lifetime.

In 1928 and 1929, I added several more species to the list of the victimized. One in particular was that of a Phainopepla (*Phainopepla nitens*) feeding a young cowbird in its nest with one of its own offspring. The cowbird actually was forcing the young "Pep" from his rightful cradle, and the adults were simply gorging the hoggish young cowbird with all the food it could hold, seemingly forgetting about their own "child" that was "somewhere in the bottom" of the overcrowded nest.

The following is a detailed report of cowbird parasitism for nine years of observation over a restricted area.

Date	Name	Number own eggs	Number cowbird eggs	Condition
April 16, 1920	California Yellow Warbler	2	1	occupied
May 10, 1920	California Yellow Warbler	3	1	occupied
May 10, 1920	San Diego Song Sparrow	3	1	occupied
May 12, 1921	California Yellow Warbler	3	1	occupied
April 21, 1922	California Yellow Warbler	3	1	occupied
May 1, 1923	California Yellow Warbler	2	2	deserted
April 26, 1924	San Diego Song Sparrow	3	1	occupied
May 15, 1925	Russet-backed Thrush	2	1	occupied
May 17, 1925	San Diego Song Sparrow	2	2	occupied
May 20, 1926	California Yellow Warbler	3	1	occupied
May 20, 1926	California Yellow Warbler	2	2	occupied
May 20, 1926	California Yellow Warbler	3	1	deserted
May 20, 1926	California Yellow Warbler	0	3	occupied
April 14, 1927	Western Gnatcatcher	3	1	occupied
April 14, 1927	San Diego Song Sparrow	3	1	occupied
April 20, 1927	California Least Vireo	2	1	occupied
April 30, 1927	California Least Vireo	2	2	deserted
May 8, 1927	Arizona Hooded Oriole	4	1	occupied
May 8, 1927	Pallid Wren-tit	3	1	occupied
May 15, 1927	Long-tailed Chat	3	1	occupied
April 28, 1928	Willow Goldfinch	2	1	occupied
May 1, 1928	Pacific Yellow-throat	3	1	occupied
May 30, 1928	San Diego Towhee	3	1	occupied
April 30, 1929	California Least Vireo	1	2	deserted
May 11, 1929	California Least Vireo	0	1	apparently deserted
May 27, 1929	San Diego Song Sparrow	0	2	occupied
June 2, 1929	Phainopepla	1 yg.	1 yg.	occupied
June 8, 1929	Traill Flycatcher	1	2	deserted

Of twenty-eight nests examined in this period of years, twenty-two were advancing normally and only six were deserted, among thirteen species, indicating that approximately four out of five nests observed which were victimized by cowbirds continued to produce broods unmindful of the parasitism. Of the six nests deserted, three were those of the California Least Vireo (*Vireo bellii pusillus*), of which there were only four nests found.

To sum up my observations, it would seem that in this area, the nest of the California Yellow Warbler was the choice prey, the birds making the best and least suspecting foster-parents, and that the California Least Vireo resented most these intrusions, even to the point of nest desertion. Further, the fact that the cowbird laid an egg about five o'clock in the afternoon seemed interesting, as the general belief is that eggs are laid during the early morning hours. Undoubtedly, there must be many cowbird eggs dropped because of no convenient nest in which to lay them, but as there are apparently numerous individuals depositing eggs throughout the day, the increase in their numbers can readily be realized. The finding of the egg in the nest of a San Diego Towhee was also interesting for the fact that the nest was exceedingly well concealed in tall grasses flush with the ground, and the question I would like to have answered is how and where did the cowbird remove the towhee egg at the time of the usurption, as the nest was already on the ground, and with no tell-tale shell in sight?—J. STUART ROWLEY, *Alhambra, California, November 10, 1929.*

EDITORIAL NOTES AND NEWS

The fifth Annual Meeting of the Cooper Ornithological Club will be held in Los Angeles and vicinity on April 11, 12 and 13, 1930. Sessions for the presentation of scientific papers will be held on Friday, April 11, and Saturday, April 12. The meeting of the Board of Governors will be held on April 13. Chairman Miller has appointed the following committee to arrange for the meetings: W. Lee Chambers, finance; Donald R. Dickey, hospitality and general conclaves; Harry Harris, publicity and correspondence; L. H. Miller, scientific program; George Willett, meeting arrangements.

The Mailliard Prize of One Hundred Dollars, offered for the best article on western birds to be submitted during 1929 for publication in *The Condor* was won by Mr. J. M. Edson, of Bellingham, Washington. His article, entitled "Recession in Weight of Nestling Birds," will appear in our May issue. It was chosen from among fifteen articles which were selected out of many more as meeting the conditions of the competition (see Condor, 31, 1929, pp. 40-41). It will be recalled that it was the intention of the donor of the Prize, Mr. Joseph Mailliard, Honorary Member of the Cooper Ornithological Club, thus to encourage persons who do not have ready access to large libraries or to extensive collections of specimens, to make independent studies of living birds.

The biennial membership roster of the Cooper Ornithological Club will appear in the May issue of *The Condor*, to go to press about April 15. Please send to the Editor promptly any changes of address or other pertinent information, so that we may have this roster as accurate a record as possible.

Mr. Alex Walker, one of Oregon's most active ornithologists during the past several years, has recently been appointed field collector for the Cleveland Museum of Natural History. He will carry on active field work in Oregon and adjacent states for the next several months. Mr. Walker joins the Cleveland institution well qualified for his duties as bird collector, having had ample experience over a number of years in building up a representative bird collection of his own. —S.G.J.

The September, 1929, issue of *The Wilson Bulletin* contains an article of extraordinary excellence. This is a thorogoing study of the Harris Sparrow, presented by Professor Myron H. Swenk and Mr. O. A. Stevens as the result, obviously, of a very great amount of study. Ten years previously, the early history of this sparrow, and its local behavior in the Kansas City region, had been given quite fully by Mr. Harry Harris in the *Auk*. The present contribution gives an exhaustive account of the entire distribution of the species, based on an amazing number of records. These plotted on a map show an exceedingly limited breeding area, almost as small wintering range, but very wide latitude of occurrence in seasons of migration and as straggling vagrants. The natural history of the species is also dealt with at length. This paper might well serve as a pattern for future similar studies of individual species of birds.—J.G.

With No. 1 of its Vol. XI, January, 1930, *The Murrelet* changes from a mimeographed style of publication to the more formal, bibliographically recognizable, printed style. Its general appearance in its new style is pleasing, and the articles in the present number are of good standard. Some of the authors represented are Stanton Warburton, Jr., Allan Brooks, L. B. Bishop, E. A. Kitchin, J. M. Edson, Kenneth Racey, and D. E. Brown. *The Murrelet* is published tri-annually by the Pacific Northwest Bird and Mammal Society, and it is edited by F. S. Hall, with J. Hooper Bowles serving as associate editor.—J.G.

Part II of W. L. Sclater's "Systema Avium Æthiopicarum" is out (our copy received February 3, 1930). This is the concluding part of the African portion of the projected systematic list of the birds of the world. The new, fourth edition of the A. O. U. Check-list now in preparation fits in as another portion of this world list. We have already reviewed at length Part I of Sclater's contribution (see Condor, 26, 1924, pp. 204-205). Part II follows the same standards, as far as we can see, in all respects. It is paged continuously with Part I, and

the total pagination is now xii + iv + 922. According to the statistical summary, the total number of forms (subspecies and species not divided into subspecies) ascribed by Sclater to the Ethiopian Region, as he limits it, is 4439. This list of African birds is published by Taylor and Francis, London; price 21s per part.—J.G.

"A Systematic Classification for the Birds of the World," by Alexander Wetmore (Proc. U. S. Nat. Mus., 76, January 8, 1930, pp. 1-8), reached us just at the critical time when it could be put to immediate practical use. Accepting it as the latest and most authoritative word as to the constitution and sequence of the higher groups down to families, and likely to hold with a fair degree of permanence for many years, we are using it as our guide in installing the 50,000-odd birds contained in the California Museum of Vertebrate Zoology in our new quarters in the Life Sciences Building, University of California. This sequence is, of course, also that followed in the new, fourth edition of the A. O. U. Check-list. Doubtless other museums will in due course also rearrange their collections to accord with this system.—J.G.

PUBLICATIONS REVIEWED

McAtee on Naturalizing Game Birds. Since the native game supply has been shot off almost, or in many places quite, to the vanishing point, sportsmen demand that the supply be recouped. The method of recoupment sportsmen see and insist upon is the bringing in and planting of exotic species. Granting this demand from the sportsmen, which evidently *must be met* no matter how unwisely or thoughtlessly grounded, it becomes the duty of the United States Department of Agriculture to offer advice, as sound as possible under the condition imposed.

To this end Mr. W. L. McAtee, of the Survey staff, has drawn up a list of "Game Birds Suitable for Naturalizing in the United States", and this selected list of species, together with well-considered general comments, has been issued as Circular No. 96, United States Department of Agriculture (November, 1929, 24 pp., 14 figs.).

Critical perusal of this circular convinces the present reader that it has been written studiously to harmonize with the special notions of the shooter, of the fish and game administrator, and of the commercial game breeder—those who, for various reasons, urge the introduction of non-native game species. It seems to us plain that Mr. McAtee all through this report adroitly avoids commitment to any positive statement of his own with regard to the basic desirability of attempting to introduce alien species at all. Apparently granting, then, that it *is* desirable to do so, he proceeds to meet, as best he can by careful marshalling of facts and words, the arguments that recently have been advanced elsewhere against the introduction of non-native species. We think his reasoning on nearly every point is eminently "logical" (to use a word that he himself employs in the course of his discussion)—save in one quite crucial factor, that involving the idea of sufficiency of food supply for native *plus* introduced gallinaceous species. He says, "The food supply for game birds can be increased almost indefinitely, however, if the effort be made" (an unassailable statement, with the "if"). But: "No introduction should be considered without prior attention to the food supply, and effectively increasing it if necessary"—another wise statement which, taken fundamentally, as it should be taken, negates the entire question of the propriety of attempting to plant additional species in a region already possessing closely related native species.

Toward insuring the "success" of plantings of foreign game birds, down-to-date recommendations are made by Mr. McAtee in regard to the importance of minutely studying habitats. The conditions which obtain in the territory to be stocked must be thoroughly known, as also the environmental factors under which the candidate for transplantation naturally lives. The discussion under this head is worthy of the closest heed by fish and game administrators. But we doubt not that despite this, the present method of haphazard, trial-and-error introduction, which prevails, for instance, to the *n*th degree here in California, will go on far into the future. In this connection Mr. McAtee presents climatological and vegetational maps of the United States, which must prove instructive to sportsmen who are wont to urge introduction of game species from almost any part of the world into almost any part of our own extremely variable country. Such maps, while in the large adequately significant, are, however, mis-

leading as to detail. For example, we note on a vegetational map, the Sacramento-San Joaquin Valley of California marked "tall grass"; hence, by context, a suitable habitat for certain tinamous!

Of course, all those of like mind with the present reviewer can but deplore the prospect of the many admittedly hardier, more aggressive, more adaptable Eurasian gallinaceous species dominating in America, to the probable final extinction of most if not all of our native kinds of upland game birds. Think of the hunter-naturalist climbing Mount Pinos at some future day, to seek a specimen of the local race of the native Sooty Grouse, only to reach the fir-clad upper slopes and put up some species of Oriental pheasant!—J. GRINNELL.

OUTDOOR HERITAGE* is a book which every Cooper Club member will want to read. It deals with those natural history subjects which hold the interests of all bird students, and it was written by a member of the Club whose success in picking out and presenting nature lore is acknowledged throughout the state of California.

Among the subjects treated in the 465 pages are the following: First there is a chapter treating of the more characteristic topographic and physiographic features of the state, along with some general statements as to the principles of animal and plant distribution. A rather full interpretation of former animal life of the state as it is revealed by fossil deposits will especially interest persons whose studies of animals have been limited to living types. Next, in turn, the animals and plants of California's valleys, mountains and deserts are treated and the more conspicuous and curious forms are indicated and described. Trees and features of them peculiar to California take up one chapter. Another on the fishes of the state contains much from the rich, first-hand experience of the author. Accounts of the principal kinds of game birds and mammals cover the whole state. Two chapters are devoted to the subjects of parks and recreation. The final chapter is devoted to conservation problems.

The task of writing a general natural history of California can be considered in no sense a simple one. Such a great lot of reliable and well selected facts have been assembled in the present work that it might have been fairer to overlook such obvious slips as the statement (p. 76) that . . . "in the wren-tit, California may boast of the only bird family peculiar to America," or (p. 283) the unqualified assertion that "the cottontail is a burrowing rabbit." The implication of richness of the vertebrate life in certain sections of the state seems scarcely justified when comparison is made with more humid areas of the United States.

Fortunately, the book has a complete index so that particular species may be looked up. A bibliography, arranged by chapters, contains forty pages of references to works dealing with the out-of-doors in California.

We have the author's own statement that he has been "most at home in writing chapters which deal with vertebrates" and his admission of regret that he should "have to resort to the printed word." Even if this book does not always stir its reader to go into the field and make firsthand nature studies it will serve well as a source of reliable facts concerning the out-of-doors. No other single volume contains so much natural history matter covering so many fields in California as this one. Strangers to California who are acquainted with the plant and animal life of another region and who wish to learn quickly the peculiarities of California's fauna and flora are the persons likely to profit most by reading this book. Even those naturalists whose lives have been spent in California will find much material new to them in some chapters.

Aside from its value as a source of natural history information this book is useful as a guide to the problems and progress of conservation in the state. Its writer has had better opportunity than any other person in late years to keep in touch with such developments and he has drawn upon this experience to provide a theme for this work. This has been done so successfully that the chapters toward the end, the ones given over entirely to conservation subjects, have for us more of real interest than the early ones.—JEAN M. LINSDALE.

*Outdoor Heritage | By Harold Child Bryant || of the series | California | Edited by | John Russell McCarthy | Powell Publishing Company | Los Angeles | 1929. Octavo, pp. 14+465, 14 ills. Price, $5.00.

LAING AND TAVERNER ON BIRDS OF THE MOUNT LOGAN DISTRICT, ALASKA.—This wording is gatherable from the rather

complicated citation below* of a decidedly noteworthy article reporting upon the bird-life of a region in southeastern Alaska lying inland a short distance from the sea-coast in the vicinity of Yakutat Bay. The senior co-author, Laing, made a three-months' trip into this territory, May to August, 1925, and the paper is based upon the specimens and notes then gathered. The Mount Logan district proves to possess a mixture of interior Alaskan bird types with humid coast forms. The faunal discussions are thus of more than ordinary interest to the student of animal distribution in northwestern America.

The literary style of this contribution is somewhat unusual in that it is quite consistently telegraphic. Reduction of wording is thus realized but, we fear, not infrequently at the expense of clearness of expression. We will now simulate the style used, in the balance of this review.

Critical notes in this paper supplied by Taverner. Some important, as follows: *Histrionicus histrionicus pacificus* and *Oidemia deglandi dixoni* both discredited on basis new material examined. Tenability of *Tringa solitaria "cinnamomeus"* [*sic* all through discussion!] upheld—as "strain", then again as "distinctly good race".

Concerning Goshawks, Taverner disagrees fundamentally with Swarth as to age diagnosis certain molting specimen. Tenability *Astur atricapillus striatulus* advocated, but on basis juvenile plumage only: specimens in hand "definitely show that marked juvenile *striatulus* [from Mount Logan] come from parents indistinguishable from typical *atricapillus*."

[Age designations obviously wrong in several places. Example: Under *Acanthis linaria*, "presumed that they breed in juvenile plumage" evidently means, rather, that they breed in first annual plumage.]

Red-tailed Hawks given further critical discussion. Opinion reasserted that bird currently called *Buteo borealis harlani* merely "phase" of *calurus*. But, since name *harlani* has priority over *calurus*, all Western Red-tailed Hawks should be called *B. b. harlani*. [The reviewer does not subscribe to this interpretation of the facts.]

Evidence at his command leads Taverner to support Alaskan race Northern Shrike, *Lanius borealis invictus*. But regarding tenability western race *Dendroica coronata, D. c. hooveri*, he thinks "geographical suggestion" main basis in favor! Mount Logan produces thrushes of *Hylocichla ustulata* group which strongly suggest "expediency of recognizing *H. u. almae*."

Notes on manner of occurrence, behavior and breeding, insofar as learned concerning the 85 birds listed, supplied chiefly by Laing. Important contributions along these lines furnished, in particular, for Golden Eagle, both species Three-toed Woodpecker, Raven, Bohemian Waxwing, Hermit Thrush, and Wheatear. Significant to note, incidentally, that Olive-sided Flycatcher of this Alaska-Canadian boundary neighborhood says *"Quick! Three Beers!* —J. GRINNELL.

*Birds and Mammals of the Mount Logan Expedition, 1925. By Hamilton M. Laing, P. A. Taverner, and R. M. Anderson. Pages 69-107, in Annual Report for 1927 (Bulletin No. 56), National Museum of Canada, Department of Mines, Ottawa, Canada, 1929 (our copy received October 28). Notes on Birds Collected and Observed in Chitina River Region, Alaska, pp. 72-95, by H. M. Laing and P. A. Taverner.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

NOVEMBER.—The November meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday evening, November 26, 1929, at the Los Angeles Museum, Exposition Park, Los Angeles, with President Harris presiding and seventeen members present. The minutes of the October meeting of the Southern Division were read and approved.

The following applications for membership were read: John Hopkinson Baker, 1165 Fifth Avenue, New York, N. Y., proposed by W. Lee Chambers; Clarence H. Sandberg, 1527 Shiller St., Alameda, Calif., proposed by H. C. Bryant; C. R. Reynard, 1418 North Sixth Avenue, Tucson, Arizona, proposed by Walter P. Taylor; Mrs. Charles W. Hart, Fullerton, Calif., proposed by Helen P. Everhart.

A letter from the secretary of the Northern Division was read stating that the Northern Division has called a special meeting for Saturday evening, December 7, to consider the report of the committee appointed last spring to study the present status of protection of the non-game birds of California. Members of the Southern Division were cordially invited to attend the meeting. Mr. Willett, chairman of the corresponding committee of the Southern Division, stated that his report was not yet completely written. He was instructed by the President to

mail his report to the Northern Division committee so that it may be used in presenting the subject to the special meeting.

In response to a letter from J. Murray Luck, Secretary of the Pacific Division American Association for the Advancement of Science, a motion made by Dr. Miller and carried, instructed the secretary to request the Northern Division to have its delegates also represent the Southern Division at the Affiliation Committee meeting which has been called for December 13 in San Francisco.

The President appointed Dr. Miller, Donald R. Dickey, and W. Lee Chambers, Chairman, as a nominating committee for officers of the Southern Division for the ensuing year.

Since the regular meeting date for December falls on New Years eve it was agreed that the President should call the meeting for an appropriate time. The meeting then adjourned to view some skins of foreign birds presented by Mr. Willett and later to inspect a live penguin now in the possession of the museum.—HAROLD MICHENER, *Secretary*.

DECEMBER.—The December meeting of the Southern Division of the Cooper Ornithological Club was held on Thursday evening December 12, 1929, at the Los Angeles Museum, Exposition Park, Los Angeles, this being a special meeting called by President Harris to take advantage of the speaker's presence in the vicinity. The meeting was called to order by Vice-president Willett with about seventy members and friends present. The reading of the minutes was waived and the election of officers was postponed to the January meeting.

The following applications for membership were read: Edwin T. Coman, Jr., 234 Valparaiso Road, Menlo Park, Calif., Harry Basner, 440 Broadway, New York, N. Y., and Russell Cecil Penrose, Grass Valley, Calif., all proposed by W. Lee Chambers.

Mr. Rollo H. Beck, one of the earliest members of the Cooper Club (1894) and for the past several years in charge of a collecting expedition in the islands of the southern seas for the American Museum of Natural History, was the speaker of the evening. He told about and showed many colored slides of the birds, animals and people of the South Sea Islands. After the lecture was completed the meeting continued with questions and discussion for some time. Even after adjournment those assembled were reluctant to break away. —HAROLD MICHENER, *Secretary*.

NORTHERN DIVISION

DECEMBER.—The December meeting of the Northern Division of the Cooper Ornithological Club was held on December 7, 1929, at 8:00 p. m. in Room 101, Zoology Building, University of California, Berkeley, with about sixty members present and President Tyler in the Chair. Reading of all minutes was omitted. Mrs. Allen moved that Chair appoint a committee of three to nominate officers of the Northern Division for the coming year. This motion was duly seconded and unanimously passed. President Tyler appointed Mrs. Allen, Mr. Grinnell and Mr. Mailliard (Chairman) and suggested that nominations be reported to the secretary before the end of December.

The purpose of this meeting being to discuss bird conservation in California, the Secretary was instructed to read the report of the committee of the Southern Division, forwarded by Mr. George Willett, Chairman. At the close of the reading the report was discussed and the secretary instructed to thank Mr. Willett for his kindness in preparing and forwarding it.

The report for the Northern Division was then read by Mr. Jean M. Linsdale, Committee Chairman. A general discussion followed the report, different members commenting upon such portions as they felt from personal experience best qualified to do.

Mr. Grinnell moved the adoption of the report and that thanks be extended to the Commitee; also, at the suggestion of Mr. Storer, that steps be taken to make the report available to all Cooper Club members residing in California. This motion was duly seconded and unanimously carried. Mr. Clabaugh suggested that a larger committee might be desirable, and President Tyler responded by adding two new members, the committee now standing as follows: Tracy I. Storer, Donald D. McLean, Joseph Dixon, C. B. Lastreto, and Jean M. Linsdale, Chairman.

At the close of the meeting Mr. Linsdale distributed lists of conservation projects needing study and asked members willing to aid in the work to sign and return the sheets, each person checking those projects which he felt best qualified to help. All members present signed and returned their lists.

Adjourned.—HILDA W. GRINNELL, *Secretary*.